

Amateur Radio



JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA
VOL 55, No 10, OCTOBER 1987

QUO VADIS?

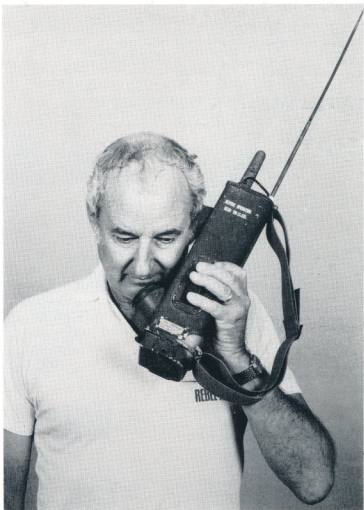
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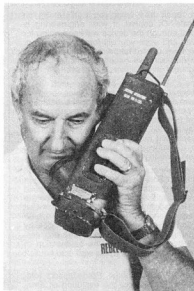
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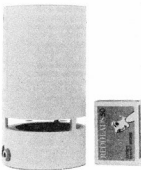
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Amateur crosses the Tasman to receive award (see page 49).



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DEADLINE

All copy for inclusion in the December 1987 issue of Amateur Radio, including regular columns and Hamads, must arrive at PO Box 300, Caulfield South, Vic. 3162, at the latest, by 9 am, October 19, 1987.

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HAMADS should be sent direct to the same address, by the same date.

Acknowledgment may not be made unless specifically requested. All important items should be sent by Certified Mail. The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying a reason.

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Editor's Comment

YE OLDE HOME-BREW

This month, for a change, let us get away from one consequence of an apparent lack of money and discuss what may often be another. Specifically, why should one build one's own radio equipment?

Before I move on to this topic (a personal favourite for 40 years!) I would like to say how heartening it is to see all the messages of support coming in for us to restore and improve the presentation of AR, although unavoidably at increased cost. See particularly the plea from George Brzostowski VK1GB, on the adjacent page. All we need is a little more money!

Now, to home-brew. It was only last November that I had a few words to say about home-brew's possible resurgence. Since then, beginning in May, we have been publishing the new "Building Blocks" series by VK3s AFQ and ZJF. Not only does this series show you how to put the bits together, but the alleged problem of "You can't get the parts any more!" has been solved. Even if you do value your spare time in dollars per minute it may still be cost-effective to build equipment this way rather than buy commercial gear.

By far the most satisfying home-brew, though, is to build something of your own design, and get it to work as required. Not many reach this happy stage, although more should be able to. Anyone who has passed the Full or Limited theory exam should have learned enough to know where to learn whatever else is needed!

But there is a disadvantage to such a unique one-off device. It has no resale value! You are the only one who can fix it when (if it) "blows up". You CAN fix it, can't you? You can't take it back to the dealer. You ARE the dealer! So perhaps you save

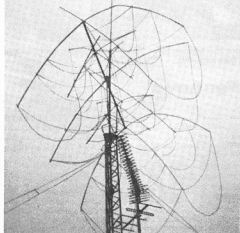
on repair bills what you don't make on resale. Of course, if your engineering is good enough the device will keep going for ever, and even you will forget what's in it. So, for your own future reference, you must "write your own handbook" while the design and construction progresses.

The kit-set, building-block approach fits in between the extremes (of "black-box" or "own design"). You get the dual satisfaction of personal construction and saving money, and because the design is well-known you may be able to resell it later. The magazine description (or kit-set manual) serves also as a maintenance handbook, which you don't have to write!

One other point is very important. We in the Amateur Service have a unique privilege in being permitted by international law to build our own radio equipment as well as operate it. Unused privileges tend to disappear. Our predecessors earned them, and we have an obligation to maintain these privileges by making good use of them. In the process, few things can exceed the satisfaction of being able to say "It works well, and I built it all myself!"

Another related theme. Predecessors (old-timers), home-brew, the evolution of amateur radio from the beginning. It's all in "HALCYON DAYS", the book just published by our good friend and colleague Al Shawsmith VK4SS, the VK4 Historian and sponsor of the Al Shawsmith Journalistic Award. It is history seen through Queensland eyes, but I am sure it interests us all. Check the announcement on page 58 of the August issue for full details. The concession price offer has been extended to September 30, so you may just be in time.

73 Bill Rice VK3ABP Editor



What would the FB Ratio be? ? ?

—Contributed by Allan VK4KAL from Oz magazine.

QUO VADIS?

George Brzostowski VK1GBB
VK1 FEDERAL COUNCILLOR

The threat in 1987 is from commercial interests demanding space.

While some see amateur radio, and the WIA specifically, as being in a form of recession, it is vital that we interpret the current situation as a challenge to be met head-on, rather than as an excuse for wholesale surrender. What follows in this and subsequent parts, should wake up a few timid souls, and if it does not, then maybe we do need to have a good look at ourselves.

You see, I am actually writing out of concern for what is happening to the WIA, but I don't like giving up — nor should you. I must confess that until I saw what passed as the August issue of AR, I suppose I was minded to keep on biting my own keyboard.

August sees the 25th anniversary since passing my full call under the guidance of Ken Mattel VK1KM/VK2KR. The WIA seemed to be a revered body then, and I promised myself that after my studies, when I could afford it, I would join.

It seemed important to join the WIA. We needed strength after losing some band space at the 1959 WARC, and relations with the PMG were not as good as they are between the WIA and DCC. The 1959 WARC had reminded us of the 1912 era when it was popular to think of placing amateurs "above 200 metres, they will not be a problem there. The "problem" in 1912 was interference with emergency services. For the 1959 WARC, the threat was from political pressure, as national administrations scrambled for broadcast space.

In fact, how many of you realise that in 1959 the Australian government delegation went with specific anti-amateur proposals, which were kept secret from amateurs until just before that conference? We owe John Moyle VK2JL, a great deal of gratitude for the space which members and non-members use today.

In 1987, the threat is from commercial interests demanding space in what are seen to be unprofitably administered sections of the spectrum, coupled with a government struggling with budgetary and trade deficits.

Yes, your bands are still under threat, whether you are an on/off mode, a CW, satellite or phone devotee; a contestant, ragchewer, experimenter or black-box operator. It does not matter whether you are an EME bouncer, purist, or just a spectrum-filler, you are under threat unless the WIA is well-supported, and capable of representing you in negotiations with our government, and through it, with other administrations.

Remember that the WIA does not exist just for its own sake. No one in their right mind would put up with the drivel and personal abuse thrown at the Federal Executive unless there was a crying need for someone to wear it, and despite the contempt, represent amateurs as "responsible" and, dare I say it unless it applied to the elusive silent majority, "mature, innovative and intelligent".

If you do not think that is true, then ask "Why?", and then ask yourself the question, what have you done?

People seem to forget that the WIA is what you, the members, make it. Calls for some new organisation, are a little like calls for someone to re-invent the wheel. If you think that the WIA could be improved, then why not use the existing mechanisms to make it better? If you think that the burden of providing the properly qualified people to form the Federal Executive is excessive for any

one Division to bear, then why not investigate structural and administrative reform.

After all, anyone thinking of a better organisation will have to think of something new.

Back to the good old uncomplicated days, when men were men, quality was quality, and amateurs were self-funded electronic frontiers-men.

We needed an organisation to disseminate our ideas and our experiments, and we needed similar organisations in other parts of the world to learn what was happening there. We needed a QSL Bureau. We needed somebody to represent us nationally and internationally. We needed coordination of course. We needed to teach and learn. We had a sense of pride. We also had a sense of humility which taught us that we were not, as individuals, smart alecks capable of taking on the might of bureaucracy, power politics, and big business under the myth of such catch cries as "individual rights", "democracy", "freedom of communication" or some other cliché seeping from the compost of wishful classics and political philosophy.

In short, we needed a union, and our union was the WIA. There was no question about it.

Every now and again, some issue would erupt — CB, novices, third party rights, band plans, repeaters, narrow and wideband modes, — but generally we seemed to be gaining something. The WIA worked out the details, and few others had to bother to find out what was really at stake. Life was good. Barbeques were hot, and the beer was cold. Pay was rising, super was reasonable, and pensions were indexed. Even the Holden could be upgraded, and the Vietnam War was, well, not exactly lost, but we disengaged from it. We were safe, as someone was bound to look after us.

Like the rest of the community, radio amateurs became complacent about all sorts of matters. We have stopped caring. As with the rest of the community, we saw that apart from adversity, self-interest and downright greed, there is now little left which draws people together. We do not even want to know what services our organisations provide for us. We take them for granted.

And, in this "good life", we started to push our own barrels. We saw an emergence of a common exhortation: "Give us more, but ask us for less. Oh, and don't tell us your troubles, we really don't want to know!" Does that sound familiar?

As anyone knows, it takes two to tango. The problems do not all come from one side.

The fact that some people seem prepared to say that the WIA has done a lot in the past, but does not seem to be doing much now, is indicative of a failure to tell people what is, in fact, being achieved — even by the simple fact that the WIA is there.

An organisation may be an achiever even though it does not boast new acquisitions of privileges. The fact that existing privileges are preserved is also an achievement in the present politico-economic environment. The fact that we are still sitting on an asset worth millions of dollars in licence fees if someone was minded to sell it to commercial interests, is an achievement of immense value.

Do not for one minute think that the WIA does nothing for you. Of more recent currency is the fact that someone is gearing up to conduct exams for new aspirants. And don't forget the reinstatement of six-metre privileges, over contentious issue of band plans, orderly frequency planning for repeaters, and now, bulletin board services. And don't forget the work done on standards, and the recent standards for video transmitters exemplifies.

In fact it seems to be more vital now than in the past to have a strong Wireless Institute of Australia.

That is what I think, what do you think?

SOME COMMENTS ON AR

I will now turn to some suggestions for saving AR.

I start by looking back over the last convention.

It is remarkable how the news of budgetary deficit was met with the response: "Where can we cut costs?" Well, maybe if we had the opportunity to view the budget in time for Divisional membership to give directions, this might not have happened. In fairness, this is not a problem which happens every year.

But, in any event, why did we shrink? Why did we not show some readiness to meet a challenge, and show some strength instead? I suppose the answer lies in the short-term view that we were representing an organisation which has members who expect to receive services, but who are determined to pay less and less in comparison with costs imposed on us from outside.

It took an individual member to ask what right had we, as Councillors, to reduce the quality of his AR without asking if people like himself might be prepared to pay what is reasonably necessary to maintain quality. I must say, in a personal capacity, I endorse his sentiments.

It is really amazing how myopic so many of us have become.

We now have what we deserve. The current product reminds me of cheap publications from the third world or from behind the iron curtain. When will we bring out the old masterpiece?

How can one expect an advertiser to see merit in placing advertisements in a publication which has no appeal about it? We must remember that from a vendor's point of view, an Institute full of penny-wise members is unlikely to contain many purchasers of his equipment.

We are already behind ARA in advertising. Comparing the two, we see approximately 3 816 square centimetres of paying advertisements in AR (including 72 square-centimetres from VK2) and 4 304 square-centimetres in ARA. One gets a feel for personal preferences when one looks at where people, ie those without the corporate dollar, go to place their private ads. There is a markedly greater number of private classifieds in ARA than in AR, and I suggest this is indicative of where people think they will get better coverage or exposure.

We must first get a firm grasp of realities. Do you know that, in order to maintain the previous level of presentation as well as service, the annual federal component needed to be raised by the equivalent price of a bottle of kitchen olive oil, or a fistful of cigarettes? Yes, \$3 or \$4 per annum is all that is missing!

There are a number of ways of tackling the problem. One is to place AR on a commercial footing, by expanding it, and selling it publicly. When I suggested this during a VK1 meeting in 1977, I recall the cynical cry, "And will you have pretty coloured photos of girls on the front?"

In those days, *Electronics Australia* and *Electronics Today* were established. There has since been the emergence of other magazines, including *ARA*, and the appearance of the British publication under the name — *Amateur Radio*. Did I hear anyone ask about copyright, or passing off? No, because our *Amateur Radio* was not being displaced from the news stands.

AR must be brushed up and go initially into every school and public library in Australia. The

school exposure is what will be of interest to those placing advertisements for the Defence forces and other careers — and that means dollars for AR.

That is one example. In 1985, I prepared an item with suggestions of how a professional advertising agent could be engaged, and where he/she should go looking for advertisements. There may have been reasons for not adopting some of those suggestions in 1985, but they should be re-evaluated when the present contract for the production of AR is renewed in early 1988.

An alternative approach is to increase federal subscriptions to say, \$35 per annum, (less than two cases of beer) but then to allow social security pensioners, students and impecunious retirees a concession rate of \$28. Yes, it does mean that some of us will subsidise others, but that is a small price to pay for self-induced redundancy.

We cannot forget the members who have a financial struggle on their hands, and we should try to accommodate them, but the proper and positive response should be to rise above the limitations of those who are our weakest, and instead aim at what we, as a whole, can achieve.

As it is time for massive lateral thinking, may I suggest that thought be given to combining AR and ARAT Advertisers would love it. Quality of the combined magazine would be higher than that of its individual precursors. Sale to the public would probably remove some of the burden from WIA members — who knows, it may even become self-funding!

Do I hear "Horrors"? What do you suggest instead?

Acknowledging that we cannot realistically expect to have our budget reviewed in the immediate future, but at the same time wanting to see a return to former quality of production, I suggest the creation of a voluntary "SAVE AR FUND", for which I enclose my donation. (A cheque for \$100 received. Ed.) We had a shortfall of about \$25 000, and if there are not at least 1 000 members who can raise \$25, or 2 000 members who can raise \$12.50 each, then maybe we should give up.

If there are 4 000 members respond, the target would be reached by individual contributions of a mere \$6.25 — yes, a box of biscuits costs more!

I hope that FE will accept my suggestion for an appeal to save our magazine, and I hope others will follow and send in donations in the immediate future.

That is what I think. What do you think?

ATTITUDE

Attitude is one of the least understood, and sometimes totally unrecognised, causes of decay — decay in not just voluntary organisations, but also in whole nations; in the decay of standards; in the decay of rights and privileges; in the virtual abolition of rights of privacy, and even the erosion of the fundamental rights of not being punished until proved guilty. If Thomas Payne was researching material for his *Rights of Man* in today's society, he might be confused between the Spanish Inquisition and the workings of modern government.

We should wake up to the fact that the attitude of amateurs is, in fact, the first threat we face. If we were anybody other than amateurs, we would be uniting and responding to meet an adverse situation — particularly one which is clearly within our own means to defeat. If we are united, we may be able to withstand the external threats to our bands and our privileges.

The WIA has had its share of internal disputes. They have been fanned by selfishness, sectional interests, bigotry, personality clashes, and far too frequently, by a total lack of diplomacy, consideration and/or maturity. Just because one passed theory, does not mean one is wise, tolerant, a good listener, or a good judge of character and personality.

These rumblings have revealed weaknesses, and encouraged some to embark on criticism, which criticism has been taken destructively, and from within, we seem to have evolved a siege

mentality. I gather that the WIA is seen by too many as embattled.

If we keep bowing to the siege mentality, by repeatedly surrendering and withdrawing, we will end up having no pride, no strength, and ultimately, no influence. When that happens, the WIA will be truly redundant.

Costs are not the only problem. Membership is vitally important. We cannot expect people to want to join unless they see for themselves what the WIA does for them. In this regard we must engage in well-directed public relations. Ultimately, it is up to individuals to appreciate that without a union, amateur radio will be a shrinking service.

On the other hand, WIA executives at all levels, should at all times let the members know what is being done by the WIA. This is as much a matter of presentation as well as content — and I think there has been some improvement, particularly with the use of the Telememo network set up by Peter Gamble VK3YRP. Ironically, Federal does not have its own terminal, and relies on Peter physically conveying his printouts or keying in releases!

As with other media elements, the truly significant achievements should be presented with a degree of headline emphasis — stopping short of outright sensation.

But, in addition to that, the consequences which would have flowed from a failure, if the WIA had failed in its endeavours in relation to a particular achievement, should also be emphasised, as not everyone has the time, inclination or readiness to think through all the issues and consequences.

That does not alter the fact that the executive, the editorial committee, and all other organs of the WIA are as good as you, the members, have the capacity to contribute. It means that it is up to you, as individuals to rally to the WIA, and to realise that if you allow it to become weak, fragmented, or shrunk, then ordinary amateurs, and not WIA functionaries, will be the biggest losers. In fact, the WIA functionaries will probably enjoy a well-earned, even if not a well-understood, rest.

Accepting that there are things which we cannot control, and accepting that we are diversely minded persons sharing diverse facets of a hobby, we must meet head-on the challenge from rising costs, the challenge from apathy, the challenge from myopia, the challenge from non-constructive criticism. I have given some suggestions, but where are yours?

Come on now, it is time for some positive thought. With apologies to Descartes, "Think and you will be".

Let us hoist up the sun, and make a new day for the Institute and our hobby. It is up to you to make sure it is a day forward. If you wait for the day to come naturally, it will be just another day closer to the end.

Those of you who admired Kennedy, will forgive me if I say, "Ask not what the Institute can do for you. Ask what you can do for the Institute, and through it, for your hobby."

Eventually, I hope that we will be able to do justice to Henry VK8HA, and have a repeat photo which will show his true colours in the near future! I wonder how many people know Henry as "Hacksaw", which probably relates to his CW operation while mobile on Northern Territory roads.

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FEDERAL NEWS

The following items are published with a view to bringing members up to date with the work of the Federal Office, and the Federal Executive in particular.

During August there was an Executive Meeting on Tuesday 25th, at the Registered Office of the Institute, as well as a Joint Meeting of representatives of the Institute and representatives of the Department of Communications, Canberra Office, held on Wednesday, August 19, also at the Registered Office.

REPORT ON EXECUTIVE MEETINGS

Some of the agenda items for this Meeting were:

- Minutes of last Meeting
- Matters Arising
- Call Signs for 1988 Bicentenary
- Future of Amateur Radio
- Amateur Radio Magazine
- Review of progress of Novices on Two-Metres
- Reports — Joint Meeting, FTAC, Standards, Finance, IARU

Due to illness, or business interstate, only three Executive members could be present at the Meeting on August 25. This is a most unusual occurrence, as all members of the Executive make every effort to attend all Meetings, as shown by Attendance Record.

However, present were David Wardlaw VK3ADW, Federal President in the Chair; Bill Rice VK3ABP, and Peter Gamble VK3YRP. Apologies were received from Ron Henderson VK1RH, Michael Owen VK3KI, Allan Foxcroft VK1AE, Ross Burstall VK3CRB, Steve Phillips VK3JY, and Bill Roper VK3ARZ. In attendance was Mrs Ann McCurdy, Secretary.

Minutes of the Meeting held on July 28, were read and confirmed.

The passing of G Maxwell Hull VK3ZS, was noted with regret. The Executive recognises Max's 37 years of genuine service to the Federal body of the Wireless Institute of Australia.

Finance

In the absence of the Treasurer, David Wardlaw presented the accounts for payment, and noted the debtors at the end of July.

Peter Gamble reported on his visit to Sydney to have discussions with advertisers.

Future of Amateur Radio Working Party

Report that the Fourth Paper is being prepared.

Report on Joint Meeting WIA/DOTC

The Executive are resigned to the fact that it appears there will not be a 1987 Call Book.

Reorganisation of the Department of Communications in Canberra reported on — now Department of Transport and Communications, with a new Minister, Senator Gareth Evans. (See page 14, for career resume of Senator Evans).

A note of interest is that, last year, in 1986, 12 percent of ministerials dealt with amateur radio. This year, so far, 40 percent of ministerials have dealt with amateur radio! As reported in an extract from the Annual Report from the Department, examinations are at present being conducted at a considerable loss; eg cost of one month's examinations — \$68 000, and \$11 000 was collected in fees.

FTAC — Phone Patch Line Isolation Unit

Peter Gamble reported that an article was finalised and published in September AR — letters forwarded to Federal Councillors to notify members regarding inspection and approval of Line Isolation Units.

IARU

David Wardlaw reported receiving accounts from IARU Region 3 Association — they have a surplus this year, even though a considerable amount of money was spent on travel.

REPORT ON JOINT DOTC/WIA MEETING HELD ON AUGUST 19, 1987

The following are highlights of action taken at the above Meeting:

Call Signs

Proposals for special call signs for events associated with the Bicentenary and Expo 88 were discussed in detail. A final DOTC check will be made before issue, since some call signs will require co-ordination with the ITU. The group V188A to V188Z is likely to be allocated for major special events.

WIA proposals for general conditions covering re-issue of call signs were reiterated. Special computer programming routines have been introduced by DOTC to meet our requests for adequate intervals on death or non-renewal.

Examinations

Further studies by DOTC on examination standards, pass rates, etc were introduced and will be followed up by Brenda Edmonds VK3KT, Federal Education Co-ordinator, at regular examination co-ordination meetings with the Department.

No major developments were reported on the examination devolution issue. A special meeting with DOTC has been scheduled on this subject for late September.

Revision of Amateur Operators Handbook

DOTC is issuing a number of separate brochures covering subjects at present grouped in the one handbook. Drafts are provided to the Institute for comment. *Operating Conditions for Amateur Stations* is almost ready for issue.

Fees

The Institute has continued to press for special consideration in the determination of Licence and Examination fees, bearing in mind the general government policy of "the user pays".

Amateur Radio Call Book

The WIA proposals are with DOTC (who control material incorporated in the Call Book). Further delays are expected.

Wireless Video Transmitters

Written WIA proposals and comment on the handling of possible EMC problems following the issue of a DOTC Standard on these devices, was further discussed. We are seeking to ensure, in particular, that ATV operations in the 576-585 MHz band are adequately protected. Further detailed proposals will be submitted by the Institute (see August AR for initial material).

Retention of the 576-585 MHz Band

Further discussion of arrangements for the medium to long term retention of this band were held and DOTC will ensure that agreements already reached are widely promulgated to their State Offices if this has not already been done.

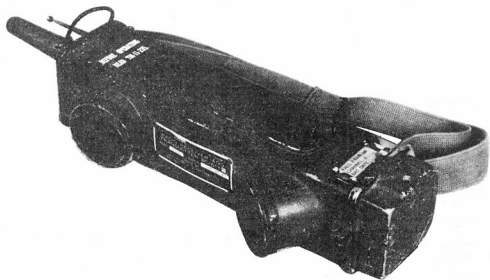
GENERAL

It should be noted that members of your Executive are all hard-working amateurs, endeavouring to make the Institute work for you. Each has a special task whilst on the Executive, by being a member of a Committee, and attending extra meetings of these committees, as well as the Executive meetings. Of the nine members of Executive, only two have retired from regular employment, which may give them a few more hours to work for you!

If you find two fly-sheets within the plastic wrapper when receiving your *Amateur Radio* magazine, please contact your Divisional Office, or the Federal Office, to advise the name and address on the extra fly-sheet. This will enable members to receive *Amateur Radio* as promptly as possible.

RECEIVER — TRANSMITTER BC-611

Nick Watling VK4YT
42 Hibiscus Lane, Holloway Beach, Qld. 4871



A hand-held transceiver weighing five and a half pounds (2.5 kg)!

I have followed, with much interest, the series of articles by various authors on World War II radio equipment. As a 13-year-old when WWII ended, I was fascinated by the seemingly endless array of communication equipment which was released on to the surplus markets; first as a trickle then into the 1950s, a veritable flood.

Like most amateurs of that post-war era, I cut my teeth on a series of converted military surplus transmitters and receivers all of which are now only memories, or occasionally preserved in a museum.

One of the more intriguing little devices which became available through disposal outlets in the late 1950s and early 60s was the US Army Signal Corps Receiver-Transmitter, type SCR536 or BC-611, known as the "walkie-talkie". In 1941, battle experience showed a need for a reliable short range hand-held, two-way voice (R/T) communications system for use in the thick of a battle at section and platoon level. The Galvin Manufacturing Corporation of Chicago, Illinois, developed a transmitter-receiver which was hand-held in the

manner similar to a telephone handset, weighed only 5.5 pounds (2.5 kg) and employed the newly developed miniature seven pin, 1.5 volt battery operated valves of the 1T4, 1R5, 1S5 and 3S4 series. It was designed to operate over ranges from 100 feet to a mile or so, in open terrain.

The set was housed in a rectangular case which was divided into three compartments. One accepted the transmitter-receiver chassis and telescopic antenna. The second the radical new layer construction BA-38 103.5 volt 'B' battery and the third, the BA-37 1.5 volt 'A' battery for the valve filaments. A dynamic ear-piece and microphone were positioned similar to a telephone handset and a "knuckle" type send-receive switch was positioned for left-handed operation, leaving the right hand free for taking notes, etc.

The set was switched on by extending the lowest section of the telescopic antenna which operated a double-pole tumbler switch. The antenna extended to a maximum of 39 inches (one metre), at which length the radio was working in its most efficient manner. No receiver volume control was fitted, it being only necessary to telescope some of the upper sections of the antenna to reduce transmitter output and receiver efficiency for close communication.

The radio must have been one of the first true transceivers in that the same valves and circuit

components were used for both reception and transmission. Change over between receive and transmit was effected by the "knuckle" type mechanical press-to-talk switch which operated 14 sections of a spring loaded water slider switch.

Table 1 shows the valve line-up functions.

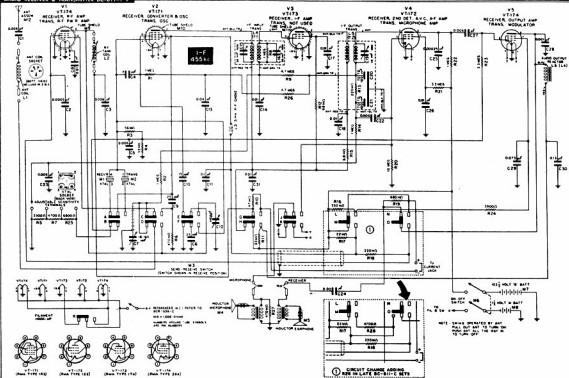
In order to preserve the life of the 'A' battery, only one half of the 3S4 filaments were used during reception, and the 1T4 IF amplifier filament was open circuited on transmit. Single ended choke coupled "Heising" modulation was employed and the power input to the 3S4 RF power amplifier was approximately 1.5 watts. Frequency range was 3.5 to 6.0 MHz in 50 crystal controlled channels. For amateur use, the trick was to purchase sets from the disposals dealer which had coils and crystals for the 80 metre band. This was realised by the dealer fraternity and, of course, the price went up for those sets. The other way was to be lucky enough to purchase the boxes of complete coil and crystal sets. These, however, were not all that plentiful and commanded an appropriate price. Batteries were still available on special order through a well-known dry battery company, up until the early 1960s. It would be a real challenge to construct a 103.5 volt 'B' battery these days!

When viewed in the context of 1941 technology, the BC-611 can only be regarded as an ingenious device and a very successful exercise in miniaturisation. When one contemplates the abundance of hand-held amateur, CB and commercial transceivers available today, I can only wonder if the Galvin Corporation realised what they were starting!

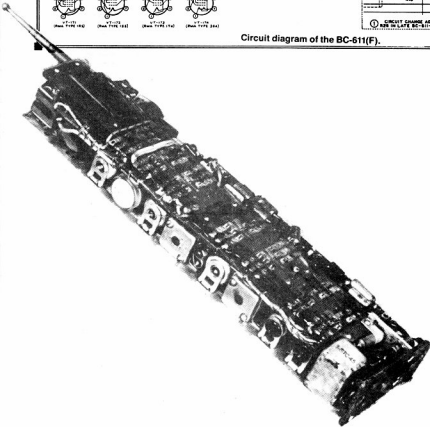
It is interesting to note that after the war the Galvin Company became the well-known Motorola organisation.

Table 1.

SIGNAL CORPS DESIG- NATION	COMMER- CIAL TYPE	RX FUNCTION	TX FUNCTION
VT-174	3S4	RF Amplifier	RF Power Amplifier
VT-171	1R5	Converter	TX Crystal Oscillator
VT-173	1T4	IF Amplifier	Not used
VT-172	1S5	Det AVC 1st Audio	Microphone Amplifier
VT-174	3S4	Audio Power Amplifier	TX Modulator



Circuit diagram of the BC-611(F).



Receiver/Transmitter BC-611(F) Chassis.

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Computer Control of Aerial Rotators with IBM-PC Type Computers

David Hryckiewicz VK2ZDE

Ken Watson VK2TKW

Computers take the strain out of tracking satellites.

A number of years ago, I became addicted to the more unusual side of amateur radio — that of tracking space-craft and satellites. I soon discovered that the average amateur would require at least three pairs of hands to operate aerial control boxes, uplink and downlink transceiver controls and the microphone push-to-talk, etc.

Everything was relatively easy with satellites like OSCAR-10, but it was a different matter when trying to work the fast-moving satellites like RS, UO9, UO11 and OSCAR-12.

Many hours were spent searching through many back-issues of Australian and overseas magazines for projects that would make tracking satellites much easier. I frequently wished I could make use of one of the computers in the shack for controlling the satellite aerial tracking system. As I listened to the Sunday weekly AMSAT-Australia broadcast on 80 metres I heard Graham VK5AGR, mention that he had received an article written by Geoff VK2ZAZ, called *Antenna Controller*. I immediately contacted AMSAT-Australia and received a copy of the article. Upon reading the article I realised that this was the project I had been searching for.

My satellite antennas were already controlled by KR400 and KR500 rotators, and these were the type of rotators mentioned in the article. The only problem was that the software required to control the interface was not suitable for an IBM-PC type of computer, but was compatible with a KAYPRO 4/84 or similar structured Z80 machine. After wondering how to solve the problem of converting the program to run from an 8-bit machine to a 16-bit machine, I decided to consult a local computer wizard, Ken VK2TKW.

After many weeks of badgering Ken, he finally created a miracle and assured me that if I built up the computer interface my problems would be solved.

Finally the big moment arrived, software and hardware were merged producing very good results. After a few teething problems hardware and software wise, the simple program Ken had rewritten to test the controller were finally working perfectly.

For some time I had been using a satellite tracking program written by R D Welch W0SL, obtained from AMSAT-Australia. The features of this program allows the tracking of up to 20 satellites. Eight satellites can be visually tracked on the map in real-time output on a colour map of the world. Whilst tracking these satellites, data for each satellite, such as azimuth, elevation, range, height, etc. is shown on the screen.

I once again approached Ken to see if he could modify this program to incorporate the ability to select a satellite from real-time mode and have the antenna controller software control the satellite tracking arials whilst viewing where the satellite is on the word map in real-time. He once again delivered, to my surprise. This program is user friendly and has been

given a thorough workout and has proved faultless.

The software has been donated to AMSAT-Australia so that funds can be raised to assist the launching of future amateur satellites. A copy of the program can be obtained by writing to AMSAT-Australia, GPO Box 1234, Adelaide, SA. 5001 or by phoning (08) 297 5104.

For those not wishing to make their own circuit boards, Rudy VK2FIM, can supply the boards at a reasonable cost. He may be contacted at (049) 43 7548 or by writing to 1-6 Ida Street, Charlestown, NSW. 2290.

This idea could be interfaced to a data base program which contains other amateur station bearings. This would allow the operator to enter the call sign of the other station and the antenna would automatically position to the bearing.

WHAT ROUTINE 1 ACTUALLY DOES

The commands for Azimuth or Elevation A/D check is poked from BASIC prior to calling this routine, into 9000 hex. The A/D value returned by this routine is stored in location 9001 hex. BASIC will peek this location at the completion of the conversion.

The actual routine starts at 9002 hex. On entry to this routine the counter is set to zero by clearing location "value." The ramp generator is turned off and any existing rotator commands are preserved by clearing only the most significant bits of location "Command." Next the ramp is turned on and the appropriate command issued to the rotator by storing it in the output port data register.

The "Busy" input to the centronics port is then tested; if this line is inactive then the counter is incremented at location "Value." The program loops back to once again test the "Busy" line, unless the count equals 255, in which case the routine will return to BASIC. When the "Busy" line is active indicating the ramp voltage = input voltage, the ramp is turned off and the routine return to BASIC with the count in location "Value."

ANALOGUE TO DIGITAL CONVERSION

The A/D converter may be divided into two parts; a ramp generator and the comparator. The ramp generator consists of TR1, TR2 and their associated components. TR1 is a switch that is controlled from the computer via D4, D5 and the 74LS03 gates IC2cid TR2 and R1-3

ROUTINE 1.

Program....8080/8086 A/D routine converted by KEN VK2TKW.

Date.....26-Nov-86

Conversion of original article from AMSAT AUST by GEOFF VK2ZAZ.

CODE	TITLE	ADC	SEGMENT
	ASSUME	CS:CODE,DS:CODE	
	ORG	9000H	
COMAND	DB	01H	;Az/EI mask
VALUE	DB	01H	;A/D count returned
START	PROC	FAR	
	MOV	DX,0378H	
	MOV	AL,[COMAND]	
	AND	AL,0FH	
	OUT	DX,AL	;turn A/D off
	MOV	AL,00H	
	MOV	[VALUE],AL	;zero counter
	MOV	AL,[COMAND]	
	OUT	DX,AL	;turn A/D on
LOOP:	INC	DX	
	IN	AL,DX	
	DEC	DX	
	TEST	AL,080H	;test busy line
	JNZ	STOP	;exit if active
	MOV	AL,[VALUE]	
	INC	AL	;increment counter
	MOV	[VALUE],AL	
	CMP	AL,0FFH	
	JNE	LOOP	;if > 255 then repeat
STOP:	MOV	AL,[COMAND]	
	AND	AL,0FH	
	OUT	DX,AL	;turn A/D off
	RET		;return to basic
START	ENDP		
CODE	ENDS		
	END		

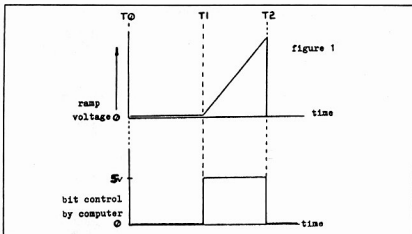


Figure 1.

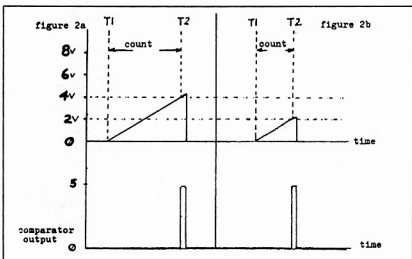


Figure 2.

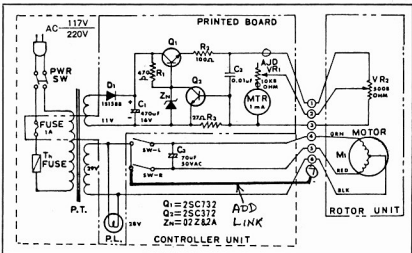


Figure 8: Schematic Diagram.

form a constant current source. This source attempts to change C1. With reference to Figure 1, at T0 the switch was closed acting as a short across C1. At T1 the computer "opened" the switch by placing a HIGH on D4 or D5 and thus a LOW on the base of TR1. The constant current source then began to charge C1 at a linear rate, producing a ramp. At T2 the computer "closed" the switch by pulling D4 or D5 LOW and thus a HIGH on the base of TR1. R18 supplies the base current to TR1 as the 74LS03 is an open collector gate to allow for the "WIRED OR" configuration of IC2cd. If the voltage on the plus input is greater than the voltage on the minus input of IC1 (LM339), then the output will be HIGH. If the voltages on the input were minus input higher than plus input then the output would be LOW. To convert the analogue input to a digital output the analogue input is applied to the minus input and the ramp is applied to the plus input. The computer records the time interval between the closure of the switch (TR1) and the transition of the output of the comparator.

The variable resistor R1 adjusts the charge rate of C1, i.e. the slope of the ramp. This is demonstrated in Figure 2a, where at T1 the computer "opened" the switch and commenced the counter. At T2 the ramp voltage equals the voltage from the rotator, in this case four volts being the equivalent of 90 degrees elevation or north Azimuth. You will notice at T2 that output of the comparator swings HIGH and then the software turns the ramp off.

The example in Figure 2b is for an elevation of 45 degrees or a west Azimuth, you will see quite clearly the difference in time and subsequent length of count. NAND gates IC2 a/b are used to differentiate between the Azimuth and Elevation outputs. A HIGH on either D4 or D5 will allow the logical output of the respective comparator to be passed to the BUSY input of the Centronics port. At the same time the HIGH on D4 or D5 will turn on the ramp via gates IC2cd. Obviously D4 and D5 should not be allowed to both be HIGH at the same time, you wish to select between Azimuth and Elevation. R7 and R18 are required as IC2 comprises of open collector gates and incapable of supplying a high without passive pull-up. R19 and R20 lower the voltage of the Azimuth rotator signal in order that R1 may adjust for any minor difference between the voltages of Azimuth and Elevation.

ROTATOR CONTROL

The rotators are controlled by a TRIAC wired in parallel with the direction switches. The TRIACs are isolated from the computer via low current opto-coupled triac devices IC4-7. Each opto-triac has a LED wired in series via switch I to indicate the ON state. The purpose of switch I is to disconnect power from the opto-triacs to allow manual operation of the rotators without having to disconnect the controller board. A pair of NAND gates IC3 (74LS00) are wired in both the Elevator and Azimuth control lads from the computer D0-3, to prevent any rotor being commanded to operate in both directions at the same time, could be very nasty! The reason for using TRIACs in lieu of relays is to eliminate noise generator by arcing of contacts etc.

KENPRO KR-400 AND KR-500 ROTATOR MODIFICATION

Modifications to each Kenpro rotator is very minimal and consist of just one wire connected from the common of the direction switches to terminal seven (spare). Geoff and I actually mounted a five-pin DIN socket on the back (top right) of each control box and wired in parallel with the terminal block, for connection to the controller board which also has two DIN sockets mounted on the back panel. (See Figure 8.)

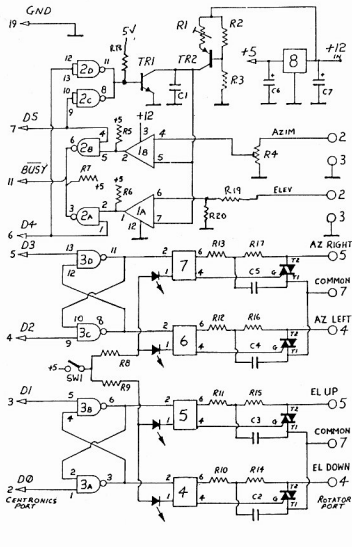


Figure 3.

NOTES

The interface requires a well regulated power supply of approximately 12 volts, the five volts is derived onboard by a 7805 regulator. Current consumption is less than 100 mA, so you could probably 'steal' it from the computer and feed it via a spare pin on the Centronics port. In my case I used a separate power supply. WARNING (well sort off), because the analogue portion of the controller is not actually isolated from the external rotator unit ensure you disconnect the controller from the rotators during storms. This could also be isolated but not considered worth the required effort. If you wish to receive Telemetry, etc., on the same computer your tracking system is using then you will require more sophisticated software. With IBM units and their clones, there is a few

multitasking programs which will allow you to run one program in foreground and the other (or, in fact, a number of programs) as background. Multitask is just one which comes to mind. Geoff has a program for Z80 based computers which will perform a similar task for that series.

FURTHER IDEAS

This idea could also be interfaced to a data base program which contains other amateur station bearings. This would allow you to enter the call sign of the party you want to contact and the antenna would automatically position to the bearing. If you do not require the use of the Elevation control then delete lines 40330, 40420-40540. The set-up adjustment differs in that you set R4 to maximum (fully clockwise)

and adjust R1 for correct Azimuth reading of 128.

FURTHER NOTES

The software for this controller project could be modified to be used with other computers such as the TRS-80, System-80, Commodore, Apple, VZ200 and VZ300, Kaypro, etc.

BASIC PROGRAM AND SET-UP

The following BASIC program can be used as "stand alone" or included in your existing "ORBIT" type BASIC program as a subroutine. To use the program by itself to align the A/D converter and test the rotator controls, proceed as follows.

1. Turn SW1 OFF to remove power to the triacs.
2. Manually rotate the ELEVATION to 90 degrees (vertical).
3. Manually rotate the AZIMUTH to 0 degrees (north).
4. Run the BASIC program and input 45 degrees for Elevations and 90 degrees for the Azimuth. The program should now be displaying a count of between 0 and 255 for Elevation. Adjust R1 to give a count of 128. Turn on SW1 and the Elevation rotator should adjust itself to 45 degrees.
5. Turn SW1 off again and hit <RETURN> to proceed to Azimuth adjustment, which is carried out in the same way as for Elevation using the count of 128 and adjusting R4 this time. When you turn SW1 on the Azimuth should rotate to 90 degrees (east).
6. At the completion of the adjustment leave SW1 on and try several positions throughout the range of the rotators to check for linearity of tracking. Tweak R1 and R4 if required for best compromise (you should not have to alter them very much — if at all).

Prior to including this routine as a subroutine into your existing BASIC program, remove lines: 40300-40360, 40490, 40540, 40590.

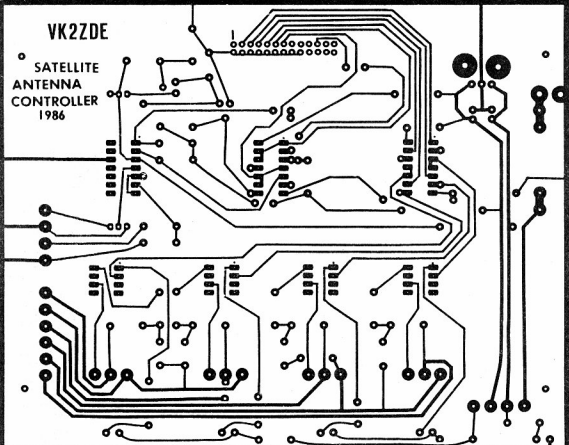
NOTE: The machine code data and pokes in lines 40230, 40240, 40250 will have to suit your particular computer.

PARTS LIST FOR COMPUTER ANTENNA CONTROLLER

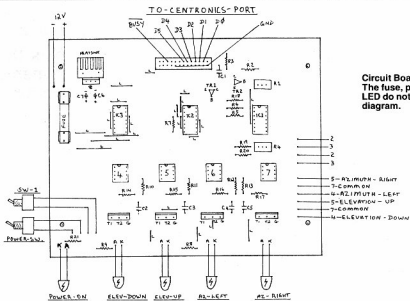
IC1	LM339	Quad Comparator
IC2	74LS03	NAND Gate (open collector)
IC3	74LS00	NAND Gate
IC4-7	3010 or MOC3021	Opto-triac (Tandy or Dick Smith)
IC8	7805	5 + Volt Regulator
TR1	BC108	NPN Transistor
TR2	BC178	PNP Transistor
D1-5	ESBR5501	High Intensity LEDs (Dick Smith)
SCR1-4	SC141D	Triac
C1-5	0.1 uF	Capacitor (Greencap)
C6-7	1.0 uF	Capacitor (Tag Tantalum)
R19	22 kohm	Resistor
R1	50 kohm	10 turn Vertical Mount Trimpot
R2	10 kohm	Resistor
R3	100 kohm	Resistor
R4	50 kohm	10 turn Vertical Mount Trimpot
R5, 6, 14, 15,		
16, 17	1.2 kohm	Resistor
R7, 18	4.7 kohm	Resistor
R8, 9	470 ohm	Resistor
R10, 11, 12, 13	180 ohm	Resistor
R20	47 kohm	Resistor
R21	560 ohm	Resistor
SW1, 2	SPDT	Switch
1	H-3490	Heat-sink (Dick Smith)
2	H-1700	Fuse-clips (Dick Smith)
1	2 amp	Fuse
	H-2505	Case (Dick Smith)
Misc		Centronics Plug, DIN Connectors, etc.

VK2ZDE

SATELLITE
ANTENNA
CONTROLLER
1986



Circuit Board.



Circuit Board Layout.
The fuse, power switch R21 and "power on"
LED do not appear on the schematic
diagram.

**QSP****WHAT IS THE STANDARDS ASSOCIATION OF AUSTRALIA?**

The Standards Association of Australia, founded in 1922, is an independent, non-profit body, incorporated by Royal Charter. Its work is conducted solely in the national interest and its principal functions are to prepare and publish Australian standards and to promote their adoption.

Because it enjoys the active co-operation of the Commonwealth and State governments and of Australian industry and commerce, the Association is able to provide the machinery whereby Australian standards can be prepared for the overall benefit of the national economy.

An Australian standard is prepared only after a full inquiry has shown that the project is endorsed as a desirable one and worth the effort involved. Standards may take the form of specifications for materials and products; codes for safety of individuals, equipment and structures; guides to sound working practices; methods of analysis or test; glossaries of terms or nomenclature, etc. They are prepared by representative committees and are based on voluntary agreement which takes into account manufacturing capability and production efficiency in conjunction with users' reasonable needs. They seek to achieve fitness for purpose, simplified production and distribution, replacement interchangeability, adequate variety of choice without wasteful diversity, conservation of resources, commonality of interpretation in technical and scientific communication, and uniformity in regulations relating to safety of life and property.

The principle sources of funds for the work of the Association are income from the sale of its publications; a grant from the Commonwealth government; annual contributions from State governments and subscribing members; and income from voluntary agreement which takes into account manufacturing capability and production efficiency in conjunction with users' reasonable needs. They seek to achieve fitness for purpose, simplified production and distribution, replacement interchangeability, adequate variety of choice without wasteful diversity, conservation of resources, commonality of interpretation in technical and scientific communication, and uniformity in regulations relating to safety of life and property.

The affairs of the Association are managed by a Council comprising nominees of Commonwealth and State governments, of Australian industry through associations of manufacturing and commercial interests, of professional institutes, and of other bodies representing a diversity of community interest.

Those interested in the work of the Association are invited to call at the Head Office or any Branch Office or to write for literature.

The WIA Standards Association Representative is Alan Foxcroft VK3AE

```

40000 'PROGRAM ..... SUBROUTINE FOR ORBIT TO ACCESS A/D
40010 'DATE ..... 26-NOV-86 to suit IBM style computers
40020 'UPDATE .....
40030 'NOTES:
40040 '
40050 ' THIS PROGRAM IS CALLED VIA GOSUB FROM ORBIT TYPE PROGRAM
40060 ' ON ENTRY TO THIS PROGRAM E = ELEVATION IN DEGREES 0 - 180
40070 ' ON ENTRY TO THIS PROGRAM A = AZIMUTH IN DEGREES 0 - 360
40080 '
40090 '
40100 '
40110 '
40120 '
40130 '
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TM-221A 2 METERS
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Senator Gareth Evans is the Minister for Transport and Communications in the third Hawke Government, elected in July 1987.

He was Attorney-General in the first Hawke Government, from March 1983 to December 1984, and Minister for Resources and Energy (and Minister Assisting both the Prime Minister and Foreign Minister) in the second Hawke Government, from December 1984 to July 1987.

He had been Deputy Leader of the Government and Manager of Government Business in the Senate since February 1987.

Aged 42, Gareth Evans has First Class Honours degrees in Law from Melbourne University, and in Politics, Philosophy and

Economics from Oxford University, and became a Queens Counsel in 1983.

Before entering the Australian Parliament as a Senator for Victoria in 1978, he was a barrister specialising in industrial law, and before that, an academic lawyer at Melbourne University specialising in constitutional and civil liberties law.

He has written or edited six books, and has numerous published articles, on legal and constitutional reform and Labor Politics.

Senator Evan's main policy interests outside his portfolio are foreign affairs, law reform and public administration.

He is married with two young children to Dr Merran Evans, who lectures in econometrics at Monash University.

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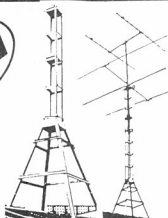
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MODULE E

Two Watt Two Metre Power Stage

In describing Module E, the two watt linear amplifier stage reference will be made to setting up the transmit converter and the switching arrangements.

Throughout this project so far emphasis has been placed on high levels of performance which is easy to duplicate. The two watt power amplifier is no exception, the circuit arrangement is classic, prototypes work every time, is economical and performs well.

In fact only the choice of transistor is unusual. The device is a Motorola MRF262 or New Tone Electronics NTE342. Packaged in a TO-220 flat plastic package, this device is rugged, easy to mount and economical. Bias for the transistor is provided by the combination of E1R1 and E1D1. Diode E1D1 must be in thermal contact with the transistor case when everything is mounted on the heat-sink, leave E1 as the last component to go on and put a small blob of silicone thermal compound on top of the transistor and then push the diode into it for good thermal coupling.

Following the power amplifier stage proper is provision for a two section low pass filter, this can be included to ensure that harmonic output is reduced to a minimum when the PA is being used on its own. In the first instance the filter components should not be fitted, a bridge of tinned copper wire approximately 5 mm above the PCB should be soldered between the point where the upper end of L20 is shown to where the right hand end of L21 is shown. Once the initial alignment is complete, then the filter components can be fitted and adjusted for best output.

The last feature provided is a forward power output sensor. Module 1DC1 is a hybrid directional coupler in a package the same as the SBL-1 mixers used elsewhere. Rated for a maximum of three watts from 5 MHz to 500 MHz, this coupler is ideal for monitoring the output of the amplifier and later for use in an ALC setup if desired. The ALC output terminal on top edge of the board can be used as a tune-up power indicator if the output is terminated in a 50 ohm load.

If you do not have a 50 ohm load suitable for two metres then one can be built very simply with two 100 ohm, two watt metal oxide resistors in parallel. These are obtainable from Stewart Electronics in Melbourne and are known as type RA02-100 ohm.

CONSTRUCTION

These notes on the layout drawing should be followed carefully. All leads should be kept as short as possible. Whilst no heat-sink is specified for E1Q1, one will definitely be necessary. A suitably machined piece of aluminum will be available with the kit versions from the Frankston and Mornington Peninsula Amateur Radio Club. (Refer for complete address at the end of this article).

The heat-sink is mounted under the PCB and the two 4-40 screws supplied are used to hold the heat-sink in place, one through the transistor mounting hole and one in line with that on the bottom edge of the board. A nylon washer should be used under the head of the latter screw.

You will notice when looking at the layout drawings that each RF connection point has four extra holes around it. This allows for the use of SMB/SMC coaxial connectors on all RF lines. Pre-assembled cables and the appropriate sockets will be available from the club supplying the kits. Please request the special list of cables and connectors from them.

Despite the fact that there may seem to be an inordinate number of ground plane pin throughs marked on the layout drawing, it is a good VHF practice to ensure that the two ground plane sections are well connected. To ensure optimum performance, take the time to install all of them carefully.

ALIGNMENT

Connect the output of the amplifier to a dummy load rated for at least two watts. Set E1C1 and E1C8 to approximately mid point. Turn on the power and apply some drive, say 100 mW. Now adjust both trimmers for maximum drive.

SWITCHING

On the end of the receive converter board is provision for a relay to switch the IF signals and the power supply for these four modules. The

pin labeled +12V Perm on the PA schematic should be connected to the 12V DC input on the LO module, likewise terminal PTT on the PA board should be connected to the same pin on the LO module. Module E1 is provided with a relay to switch the antenna side if needed. Schematic drawings of several possible connections are shown.

TRANSMIT IF ATTENUATORS

As mentioned in Part Two of this series, if your exciter puts out in excess of -10 dBm (100 uW), you will need to put an attenuator in the transmit converter input. The following tables of attenuator values show the values required for a variety of attenuators.

ATTENUATOR DESIGN TABLES AND SCHEMATICS

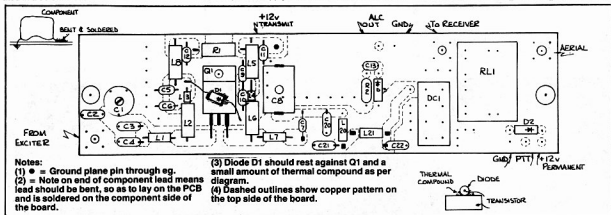
Table of Attenuator Values

This first attenuator table (Table 1) gives the calculated values for a range of attenuators and then the closest one percent resistor value readily available for constructing your attenuator.

Desired Attenuation	Calculated Value				Closest 1 percent value			
	R1	R2	R3	R4	R1	R2	R3	R4
1dB	22.8	433.3	5.6	882.5	3.00	430.0	5.6	886.0
2dB	5.7	215.2	11.6	436.2	5.82	215.0	11.0	432.0
3dB	8.5	141.9	17.6	292.4	8.45	143.0	17.4	294.0
4dB	11.3	104.8	23.8	221.0	11.0	105.0	23.7	221.0
5dB	14.0	82.2	30.4	173.5	14.0	82.5	30.1	178.0
6dB	16.6	66.9	37.4	150.5	16.5	66.5	37.4	150.0
7dB	19.1	55.8	44.8	130.7	19.1	56.0	45.3	130.0
8dB	21.5	47.3	52.8	115.1	21.5	47.5	52.3	115.0
9dB	23.8	40.6	61.6	103.0	23.7	40.2	62.0	103.0
10dB	26.0	35.1	71.2	96.2	26.1	34.8	71.5	95.3
20dB	49.0	10.1	247.5	61.1	41.2	10.0	249.0	62.0

Table derived in part from *The UHF Compendium* K Weiner DJ9HO, Verlag Rudolf Schmidt 1982. Available from WIA Magnums.

Whilst the above table gives one percent values these are only readily available in 250 mW ratings. High performance one watt and two watt metal oxide resistors are readily available and can be used in conjunction with lower power attenuators to achieve the desired result. The following table gives the five



percent preferred values for attenuators using these resistors.

Desired Closest 5 percent Value

Attenuation	R1	R2	R3	R4
3dB	8.2	150	18	300
6dB	16.0	68	36	150
10dB	27.0	36	68	100

Inspection of the schematic above will reveal that the attenuator can be realised in two sections, the first, A2R20, A2R21, A2R22 is a pi section and the second, A2R23, A2R24, A2R25 is a 'T' section. Given the values in the table above one can then use various combinations to achieve the desired power level and attenuation values.

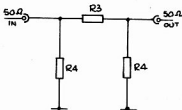
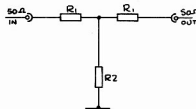
CONCLUSION

Technical Editor's Note: The drawings and layout guides should be easy to follow, if you have trouble please contact the writer, by mail, enclosing a stamped self addressed envelope. The author regrets that he cannot answer telephone queries due to business commitments, though his call can be often heard on the Melbourne VK3REC repeater (147.175 MHz +600 kHz) and written requests will be attended to in turn.

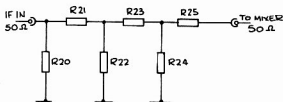
PARTS LIST — MODULE E: Sub-assembly 1 — TWO-WATT AMPLIFIER

E1C1	40pF	Foil trimmer
E1C2	24pF	Dipped Mica
E1C3	30pF	Dipped Mica
E1C4	30pF	Dipped Mica
E1C5	1nF	Ceramic plate
E1C6	100nF	Monolithic Ceramic
E1C7	24pF	Dipped Mica
E1C8	40pF	Arco compression mica trimmer
E1C9	10nF	Ceramic
E1C10	100nF	Monolithic Ceramic
E1C11	10uF	25V Tantalum
E1C12	100uF	Monolithic Ceramic
E1C13	100uF	Monolithic Ceramic
E1C20	22pF	'Unicel' mica capacitor
E1C21	60pF	Teflon trimmer
E1C22	22pF	'Unicel' mica capacitor
E1D1	1N4001	or 1N4002 rectifier diode
E1D2	1N4002	or 1N4002 rectifier diode
E1D3		5082-2800 Schottky rectifier
E1DC1		PDG-10-1 Mini Circuits direction coupler
E1L1		21 6mm ID 16SWG enamelled copper 5mm long
E1L2	1.5uH	Moulded RFC
E1L3	FC540	Amden ferrite bead on lead of L2
E1L4	FC540	Amden ferrite bead on lead of L2
E1L5	FC57	44312-020-36630 Philips choke
E1L6	1.5uH	Moulded RFC
E1L7		21 6mm ID 16SWG enamelled copper 5mm long
E1L20		3T 6mm ID 16SWG enamelled copper close wound
E1L21		3T 6mm ID 16SWG enamelled copper close wound
E1O1	MPF262	or NTE340 RF Power transistor
E1R1	33R	2W Metal oxide 10% resistor
E1RL1	PG-1-12V	Relay

Attenuator design tables and schematics



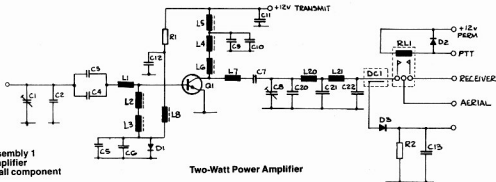
Schematics for attenuator tables



Transmit converter input attenuation

Module E Sub-Assembly 1
2 Metre 2 Watt Amplifier
Note: E1 prefixes all component designations

Two-Watt Power Amplifier



A DIRECT READING CAPACITY METER

Ken Kimberley VK2PY
21 Nicoll Street, Lakemba, NSW 2195

A full blown impedance bridge complete with Bells and Whistles!

A combination of deteriorating eyesight and a proliferation of different coding methods made it almost impossible for the author to decipher the value of the newer capacitor styles. Hence, some form of capacitance meter was needed.

Even though the writer is in a position to purchase something suitable, it goes against the grain to do so! Particularly after spending almost a lifetime in the instrument business. Besides, many other goodies could be purchased with the cash saved.

It therefore appeared that the *Murphy bit* would have to be endured again in order to design and construct something suitable. No, blow the pride, let us build to a published design because my so-called little jobs seem to escalate into major projects. Sometimes they go on for over a year, or so, and frankly we don't have too many left!

Out with a great pile of accumulated magazines, new and old. What would it be? A full blown impedance bridge complete with "Bells and Whistles." Such features include variable frequency and voltage excitation, tuned detectors, polarising potential, loss factor dials, etc. All of these are fine for the laboratory, but not really necessary for average amateur use.

The rationale here is, that if "C" can be ascertained, then most other parameters may be had from the manufacturer's specifications, etc.

Sure, this may appear to be the coward's way out, but sometimes it pays to use the KISS (Keep It Simple Stupid) method. Accordingly, a rather simple circuit was found in the October 1985 issue of *Practical Wireless*. This featured a "CR" type VCO, the output of which is applied to the Capacitor Under Test (CUT) and

the resulting current flow monitored by a moving coil meter.

Correct choice of frequency allows the original 0 to 100 (etc) markings to coincide with capacitance values (refer Table 1).

STATEMENT ONE

States that the current through a capacitor is directly proportional to its capacitance, given a fixed voltage and frequency.

STATEMENT TWO

Conversely, the current will also be directly proportional to the frequency providing that the "C" and applied "E" is constant.

MOCK UP

The concept seemed so unbelievably simple that it was decided to throw a "mock up" together. The junk box yielded the germanium diodes (not silicon) and the 1000 μ F electrolytic. These were connected haphazardly as per the dotted section of Figure 1 with the station analogue multimeter serving as the detector. The 12 volt output level from the author's square wave generator (see AR, November 1986), was used as the excitation source.

Various capacitors were connected to "CX". Some made the pointer bang hard over and some did not move the meter. However, a few wondrously produced a scaleable reading which increased when some of the "non-reading" ones were added in parallel. Okay so far! Doubling the frequency increased the multimeter indication by two.

Apparently the basic idea was sound, and the measuring range could be varied by the applied frequency. In other words, it seemed "a goer."

CONSTRUCTION

Accordingly, an off-cut of one millimetre sheet bakelite was obtained and trimmed to 60 x 100 mm. This was then drilled so that it would

mount neatly onto the back of the meter, being held by the terminal screws.

Next the few component parts required were obtained and placed onto a sheet of drawing paper. These were shuffled around until a neat and satisfactory layout was produced.

The next job is to transfer this to the bakelite, which is then drilled to take circuit pins, eyelets, etc (whatever takes your fancy) — the author chose to use a combination of the two. Circuit pins for those connections which may require changing; ie transistors, signal paths, adjust on test components, etc, whilst eyelets are good terminations for resistors, capacitors and wiring junctions, etc.

Neatly wire the components as per Figure 1 then fix the board back onto the back of the meter, not forgetting to use lock washers under the nuts.

Now, obtain a suitable box and drill the necessary holes. Spray paint in your favourite colour. When dry, label the front panel with *Letraser*® or similar, and mount the hardware and meter. Run the remaining wiring, taking care to avoid unnecessary stray capacity around the "CX" circuitry, which would degrade the calibration on the lowest range.

COMMENT

Your capacity meter is now ready for calibration; the construction was really a wet-day project, wasn't it!

NOTE that this accessory is entirely passive and as such does not require any power supply. The excitation requirement being a nine, or preferably 12 volt signal, the frequency of which should be adjustable in decade steps from 10 Hertz through to one megaHertz. The square wave generator mentioned earlier is an ideal source, the main attribute being that the crystal controlled switchable frequencies are precise and repeatable.

Figure 1: Circuit Diagram of Module.

- C1 = 1000 μ F 16 V Electrolytic
- C2 = 1000 μ F 6 V Electrolytic
- C3 = Adjust on Test 1000 μ F 6 V Electrolytic

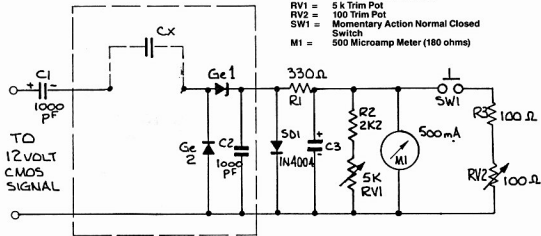
Ge1, Ge2

- Ge1 = Germanium Diodes
- SD = Silicon Rectifier 1N4004 etc
- R1 = 330 Ω Metal Film Resistor
- R2 = 2.2 k Metal Film Resistor
- R3 = 200 Metal Film Resistor

- RV1 = 5 k Trim Pot
- RV2 = 100 Trim Pot

- SW1 = Momentary Action Normal Closed Switch

- M1 = 500 Microamp Meter (180 ohms)



CALIBRATION REFERENCE

A capacitor of known value will be required for initial "set-up". Ideally it should be a 47 nF unit, however, an 0.47 or even 4.7 μ F will be satisfactory. Three options are available to constructors —

1. Beg, borrow, buy or "otherwise obtain" a capacitor as above, having a stated tolerance of say \pm one percent.
2. Obtain a "wider" tolerance unit and have it measured on a laboratory standard measuring instrument.
3. Educated "guess-work". More about this later.

SETTING UP PROCEDURE

- This is quite simple and takes only a few minutes. It goes something like this —
- a. Plug "instrument under test" into the source.
 - b. Connect the "reference C" across the "CX" terminals, assume the "CX" to be 47 nF. This makes for easier description.
 - c. Set generator at one kilohertz.
 - d. With "SW1" depressed adjust "RV1" until the meter indicates 470 microamps; is 94 percent of full scale deflection (FSD).
 - e. Release "SW1" and adjust "RV2" until the meter reads 235 microamps (47 percent FSD).

Your capacitor measuring module is now ready for work on any range. Verify this if you wish, remember that a downwards frequency change of one decade will increase the range by a factor of 10 and vice-versa. See Table 1.

FREQUENCY	FSD
10 Hz	10 μ F
100 Hz	1.0 μ F
1.0 kHz	0.1 μ F
10 kHz	10 nF
1.0 MHz	1.0 nF
10 MHz	100 pF

Table 1.

Of course other FSDs are available if required. Supposing the constructor prefers a full scale change of, say, two, then it will only require halving the frequency.

The application of 50 Hertz will result in a full scale reading when 2 μ F is presented to the instrument.

HELP! NO REFERENCE!

For those souls who cannot obtain the necessary "reference C" a little finessing will be required. Proceed as follows —

Obtain, say, six (the more the better) 47 nF capacitors in as many different types and manufacture as possible.

Number them for reference. Connect sample "one" across the "CX" terminal.

With "SW1" operated adjust "RV1" as previously.

Record sample one as having an arbitrary value of 47 nF.

Without moving "RV1" repeat step five for the remaining capacitors.

Study the recorded readings and establish the mean value.

The sample closest to the calculated mean value now becomes the "reference". Re-adjust "RV1" to give a reading of 47 nF for this sample.

Adjust "RV2" as previously explained.

It is recommended that this "reference" be kept against future use (or until something better is obtained). An ideal storage place would be inside the unit.

The rationale of this approach lies in that, hopefully, some of the 47 nF units will be high, whilst some will be low. Therefore some of the errors should cancel.

This method is the least recommended, but is better than nothing.

METER PROTECTION

The circuit as first envisaged had one minor flaw, in that short circuited or over range capacitors could be rather hard on the meter.

For those of you who are fortunate enough to have a well-damped instrument for this project, fine, life will be a little easier for the movement. However, it is recommended that the following protective measures be included anyway — after all, how much does one silicon rectifier and two electrolytics cost?

The functions of these components are explained below —

C1 1000 μ F 16 volt Electrolytic Capacitor. The sole purpose of this component is to prevent a fairly heavy direct current flow down to "0" volts, which would occur if "CX" were to be short circuited. It is not really required in the module, but is certainly necessary in the free-standing unit to be described later. Hence, it is no great hardship to fit now.

C3 This is an "Adjust on Test" component and its purpose is to dampen the pointer so that it does not go KLUNK against the top stop on overloads. A bit of trial and error is required here. The idea is to arrive at a compromise between protection and pointer settling time. The author determined that his meter required a 1000 μ F six volt electrolytic. It must be pointed out that, within reason, overloads of maybe up to around 1000 percent will not unduly overheat the coil. Usually it is the mechanical shock that does the real damage, hence the need for damping the meter response.

SD Almost any silicon rectifier will do here, however, if it must be purchased, a 1N4004 or similar, will do admirably. Its function is to limit the voltage across C2 caused by gross overload.

Refer Table 2.

2.0 μ F RANGE				$\div 2 = 0.5 \mu$ F RANGE			
WITHOUT "SD1"		WITH "SD1"		WITHOUT "SD1"		WITH "SD1"	
APPLIED "C"	RECOVERED "E"	APPLIED "C"	RECOVERED "E"	APPLIED "C"	RECOVERED "E"	APPLIED "C"	RECOVERED "E"
0.2 μ F	92 mV	92 mV	0.1 μ F	55.8 mV	55 mV		
0.4 μ F	180 mV	180 mV	0.2 μ F	110 mV	110 mV		
0.6 μ F	266 mV	266 mV	0.3 μ F	164 mV	163 mV		
0.8 μ F	350 mV	351 mV	0.4 μ F	215 mV	214 mV		
1.0 μ F	0.434	0.428	0.5 μ F	266 mV	265 mV		
	V*	V*					
2.0 μ F	0.82 V	0.574 V	1.0 μ F	0.515 V	0.484 V		
3.0 μ F	1.18 V	0.611 V	1.5 μ F	0.750 V	0.587 V		
4.0 μ F	1.49 V	0.631 V	2.0 μ F	1.380 V	0.619 V		
5.0 μ F	1.70 V	0.645 V	4.0 μ F	1.740 V	0.638 V		
6.0 μ F	1.99 V	0.655 V	5.0 μ F	2.450 V	0.651 V		
7.0 μ F	2.25 V	0.653 V					
8.0 μ F	2.44 V	0.689 V					
9.0 μ F	2.607 V	0.674 V					
10.0 μ F	2.752 V	0.678 V					
	V	V					

Table 2.

NOTE — a capacitor of 1.0 μ F (on the 1 μ F range) generates a potential of 0.0434 volts across C2, whilst 10.0 μ F on the same setting produces 2.75 volts; is a difference of about 640 percent.

Fitting the silicon diode reduces this to around 145 percent. In other words, a capacity over-range of 1000 percent overloads the meter by 45 percent. Quite an improvement isn't it?

The foregoing data clearly shows that meter M1 is well protected against accidental overloads in this module.

OPERATING INSTRUCTIONS

The operation of this device is quite simple and goes like this —

1. Set exciter frequency to 10 Hz.
 2. Connect unknown capacitor across "CX" terminals.
 3. If the meter indicator is below 10 percent of FSD adjust the frequency upwards in decade steps until meter provides a clear reading.
 4. Sensitivity and accuracy may be doubled by pressing SW1.
- CAUTION: DO NOT operate this control for readings above half scale.

The numerical reading so obtained represents the significant figures of the unknown capacitance value, and the multiplier factor may be obtained from Table 1.

The sheer simplicity of this device belies its performance and it was not long before a swag of nondescript capacitors had been checked. There were certainly some surprises among them.

Many thanks to my sister, Mrs B Brown, of Burrill Lake, for her excellent typing effort.

A LA CARTE

Readers are asked to take note of the dates (years not palms!).

YFs planning an evening dinners for their OM's as a group may be interested in this fascinating menu — a la carte — given below. It is taken from the *Wireless Weekly*, August 18, 1922, page 3.

"Among the most cherished possessions of Mr Phil Renshaw is a menu card of a farewell dinner tendered on November 20, 1911 by the Wireless Institute of New South Wales to Messrs W H Hannan and C Scandell, prior to their departure with the wireless section to the South Pole and Macquarie Island."

The card reads:

MENU (No Relays Allowed)

1. Hors D'Oeuvres (look out for 'pherics).
2. Croute au Caviar, Olive in transformer oil.
3. Macquarie Island Trout (caught with 1½ inch guy rope).
4. Suva Soup (so far got only by two members).
5. Tourneado de Boeuf Richelieu (CQ, IMI, RU).
6. De Forest Turkey (freshly roast penguin).
7. High Potential Ham.
8. Shellaced Asparagus.
9. Converter Jellies Polar (Bamboo, Trifle and Cream).
10. 5 KW Cheese.
11. Singing Spark Cigarettes.
12. Electrolytic Wines — Helix, Hock, Condenser Claret, Silicon Chablis, Battery Beer, Aerial Waters, Terminal Coffee — in Leyden Jars to balance capacities. (Members must not overcharge their jars, otherwise they will get out of tune).

Contributed by Alan Shawsmith VK4SS

VK7 MEMBERS PLEASE NOTE

In reference to page 4 of September's *Amateur Radio* Joe Gelson VK7JG, is no longer the VK7 Federal Councillor.

Peter Frith VK7PF has assumed the role and consequently all correspondence should be sent to him at 181 Punchbowl Road, Launceston, Tas. 7250.

Microphone Repeater Reverse for the Azden PCS-4000

David Horsfall VK2KFU
PO Box 257, Wahroonga, NSW. 2076

A simple modification for the Azden PCS-4000 which provides repeater reverse control from the microphone.

One useful way of doing this without actually modifying the rig is to store the input frequency of your favourite repeater in the VFO with the output in memory 1. Selecting reverse is then a matter of pressing the DOWN button and returning to VFO mode. To get back again, M1 CALL on the PTT is pressed. The problem with this is that you are limited to one reverse repeater operation at a time. Also, the VFO is likely to contain a random value left over from previous band scanning or the like.

By adding an extra switch on the microphone connected to one of the scan lines all sorts of extra possibilities can be realised. Since this switch needs an extra wire the PTT return wire was used with PTT now returning through the microphone braid. Although this mixing of a low level signal with other things is frowned upon, no problems were observed.

There are two interesting possibilities. This extra switch can select between scan lines R2 and R3 providing REV, H/L and SHIFT with a two button access or it can connect via a diode to scan line K3 providing single button repeater reverse. See the table in Figure 1. Since I use repeater reverse frequently when mobile this was considered to be more important than remembering which two buttons to press and so only this is described.

First, the PTT return line has to be re-defined. Remove the top and bottom covers and the front panel. The wire we require is the black one in the centre of the microphone socket. Move this wire from where it terminates on the microprocessor PCB on the grey wire near the corner — see Figure 2. This is the R3 scan line. It is also a good idea to take this opportunity to tighten all the screws attaching the PCB's to the frame. Loose screws can cause a variety of problems such as hum on receive and transmit, etc.

Now we turn our attention to the microphone. Pull it apart. Try not to lose the little PTT return spring. Remove the black wire from the PTT spring. Terminate this switch onto the microphone braid with a short length of wire inside the sleeve.

Attach a miniature momentary action switch to a convenient place. I used the place between the two buttons on the top! In this case, a lug has to be removed from the other microphone half. The wire recently removed from the PTT switch is now extended to this new switch. Use plastic sleeving over the extension joint to insulate it. The other side of the switch goes via a diode, 1N914, to the grey wire on the UP button. This is the K3 line. The cathode connects to the new switch. Note that the UP/DOWN buttons are two-pole switches hence a spare lug can be used. See Figure 3.

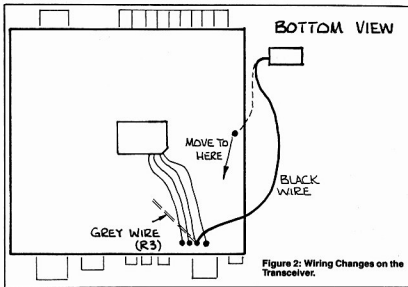


Figure 2: Wiring Changes on the Transceiver.

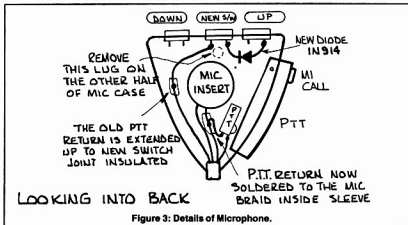


Figure 3: Details of Microphone.

	R0	R1	R2	R3
K3	MHz up	100 kHz up	kHz up	REV
K2	MHz on	100 kHz on	kHz on	H/L
K1	M scan	M addr	M1A call	Shift
K0	P scan	M call	M1B call	M write

The italic area is available on MIC.

Figure 1: Disposition of Scan Lines.

Everything can now be reassembled and tested although perhaps this is better performed in the reverse order. As usual take care to not lose any screws inside the rig. Seeing small sparks on the back of the microphone

socket is a dead giveaway that something has gone astray! Note that decoupling may be necessary on the R3 line especially since it will be noted that the microphone socket is sprinkled with small capacitors that do not appear on the circuit diagram.

Finally, enjoy the convenience of repeater reverse from the microphone, as you drive around suburbia. It goes without saying of course that the microphone plug and socket are now incompatible with the rest of the world and that funny things will happen should a standard microphone be plugged in. One way to allay any fears is to re-wire anything that plugs into this socket, RTTY kits, etc, so that PTT return goes to MIC return.

HAM TENNA WITH THE LOT

Ron Holmes VK5VH

6 Keirana Avenue, Port Noarlunga, SA. 5167

As the good book says — "Of the making of antennas there is no end and much climbing of ladders is a weariness of the flesh." Nevertheless, some of us, like the Athenians, are always seeking some new thing, so have a look at this.

If your favourite antenna is the inverted Vee — this has a double helping. If you like phased verticals, there are four of them; and if you go for 80 metre loops, here is another version — all in the one antenna! What is more, it fits in a normal sized backyard, is under the height which would need council approval, and you feed it with 50 ohm coaxial cable.

Performance wise, a number of tests with a G5RV as reference antenna, and immediate switching facilities, are the basic of a claim that, on 80 metres, it is superior, on 40 it compares satisfactorily, being better in some directions and worse than others, while on 20 metres the great majority of reports surprised me by indicating two S-points improvement, even in directions favoured by the G5RV.

The "Hamtenna" is similar to the Stepped Loop Antenna of VK5XI (AR, June 1986), but has some significant differences. (See Figure 1). At each end is an inverted Vee, 10 metres high at the apex and three metres high at the ends. The Vees are approximately 14 metres apart. In my case, the distance between the pergola and the shed!

On the permaline poles, to which the bottom ends of the Vees are anchored, aluminium verticals 2.75 metres (9 feet) long are erected. The tops of these are joined with horizontal wires 14.5 metres long; ie the verticals are 14.5 metres apart. Without a calculator you can work out that 2.75 twice, plus 14.5, makes 20 metres: so that, along each side of the loop we have, on 20 metres, a pair of quarter wave vertical, of which the top 2.25 metres is bent over, joined to each other by 10 metres of wire. The ends of the Vees are joined to the bases of the verticals.

The total length of the loop is about 84 metres and it is fed at the top of the more convenient Vee. In my case, this is at the western end. My block runs approximately east-west, but the back of it is a little north of east. I use 70 ohm coaxial cable to a transmatch, but tried it with a 4:1 balun to 50 ohm coaxial cable, then with 50 ohm coaxial cable direct. Without a tuner the SWR on the direct 50 ohm coax was as good as with the 4:1 balun on the five regular bands. Also, it compared favourably with the G5RV SWR figures.

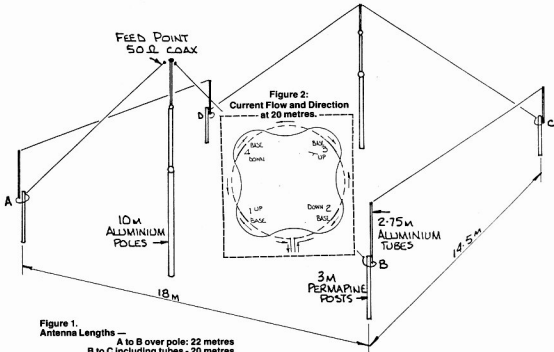
A word or two about the engineering. My back yard is 18 metres wide and about 16 metres deep. The rear Vee is a couple of metres in from the back fence to allow room for guying. I use aluminium poles which require only light guys and I can put them up and down on my own. The main guys are the legs of the inverted Vees which are tied to insulated screw eyes on the permaline posts, fixed to the fence. The light verticals need only "invisible" nylon fishing line to put a strain on the wire joining their tops.

The base of each vertical is insulated with PVC tubing and fixed to the post with a couple of saddle brackets. Wires are well tinned at the ends and fixed to the aluminium with PK screws. It might be noted that the whole antenna is fitted in a space which will take only one leg of the G5RV.

The exceptionally good results on 20 metres possibly stem from the fact that we have two pairs of 'in phase' vertical sections at the diagonal corners. (See Figure 2). The verticals are indicated by the heavy lines on the dotted circle, which represents the total loop. Note the end of each labelled 'base.' The current flow and direction at 20 metres indicates that the current is flowing 'up' in vertical sections one and three, while it is flowing 'down' in sections two and four. Note also that the vertical sections come at points of maximum current.

The radiation pattern of the antenna is, of course, very complicated, but on 80, 40 and 20 metres, it appears to have good all-round operational area. I have made comparatively few tests on 15 and 10, but it does work on those bands.

While this antenna may seem more complicated than the good old G5RV, it would appear to work as well, or better, and in many locations could be as easy to build, and easier to fit in the space available. Antennas are like motor cars — there is no best car. It is a question of what will best do what you want: what you can afford; and what will fit in your car port. For an all-band, omni-directional antenna, to fit the average backyard, the 'Hamtenna with the Lot' is worth trying.



Multi-Band Single Untuned Feeder System

Clive Cooke VK4CC

160 Silver Shores Caravan Park, Toorabul Point, Qld. 4510

This antenna is now included in most antenna handbooks. It was originally published in Amateur Radio February 1957. Here is a reprint of the original article. It is a simple solution to a problem which is still with us.

For the 1956 Remembrance Day Contest the author was in need of an all-band antenna which, as far as possible, was to include the following features:

- Good performance for the distances involved.
- It must be capable of being used on all bands from 80 to 15 metres with the minimum effort.
- Be capable of suspension from a single 33 feet (10 metres) pole centrally placed in the backyard of a suburban allotment 45 feet (13 metres) wide.
- Use only one transmission line.

After experimenting with various types of antennas, they were discarded because of the

lack of one of the desired features, the main one of which seemed to be that antenna tuning units were required.

Suddenly the thought occurred that a method employed for television multi-channel antenna systems could be borrowed. So, with the aid of two very capable assistants, an antenna (shown in Figure 1) was designed and erected within two hours.

On-air tests proved it to be the best multi-band antenna so far erected in a small backyard.

The experimentally-minded may be able to make the unused elements act as parasitic reflectors or directors. The antenna corresponding to the frequency in use is the only one which presents a correct low resistance

load to the feed line. All others present a very high impedance with very little reactance as far as can be determined.

Although coaxial cable is specified, because it is suitable for connection to the output of a pi coupler final, there is no reason why 72 ohm ribbon could not be used if link coupling is used or if otherwise required. Certainly it would be more electrically balanced.

The first night of operation with this antenna included HP3FL and VK1LJ on both 20 and 40 metre phone with both station's antennas end-on to Panama. Commercial signals on 15 metres are very strong. At the time of writing, a Swiss broadcast station is S9 plus. Where are the amateurs though?

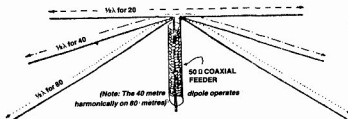


Figure 1.

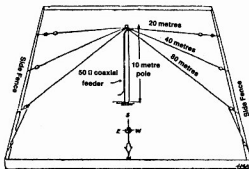


Figure 2.

"BUZZ" BLANKER FOR THE TS-430

Wayne Rhodes VK6AMS
10 Julianne Street, Busseton, WA

The standard noise blanker fitted to the Kenwood TS-430 performs well on impulse (eg ignition) noise, but is ineffective on radiated power line noise.

Other transceivers substantially reduced this type of noise so a comparison of noise blanker circuits was made and the following modifications were carried out to the TS-430.

- 1 Additional gain was provided between the Buffer and Noise Blanker Amplifier by fitting a broadband amplifier in place of C116.
- 2 The AGC threshold was raised and made adjustable by fitting a 100k trimpot in series with RB1 (10k).

THEORY OF OPERATION

Due to the lower amplitude (but longer duration) of repetitive type power line noise when compared to impulse noise, additional gain must be provided to the noise amplifier so that noise peaks can be detected. (See Figure 3.)

The noise amp AGC amplifier is provided with adjustment to allow the "Blanking Point" to be set to a level that will reduce noise but not "clip" the required signal or cause cross-modulation from strong adjacent stations.

This adjustment is made to suit the particular situation and a trade off must be made between these two points.

Results obtained in the author's case were as follows:

	OFF	STANDARD NB	MODIFIED NB
Ignition Noise	S9	S0	S0
Power Line Noise	S7	S6.5	S1
Signal (no noise)	S9	S9	S9

Although the modified blanker introduces some problems (cross-modulation can be noticed from S9+++ signals) the benefit of being able to read stations previously lost in the noise would outweigh this disadvantage in most cases.

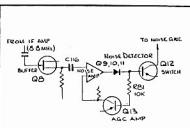


Figure 1: The Original Noise Blanker.

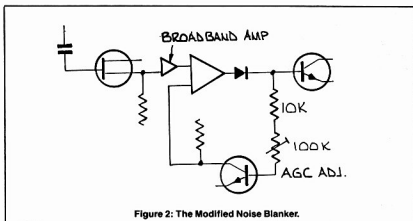


Figure 2: The Modified Noise Blanker.

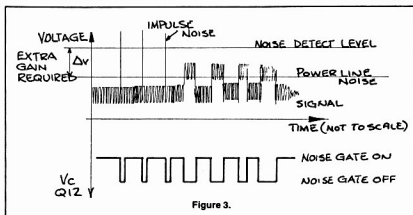


Figure 3.

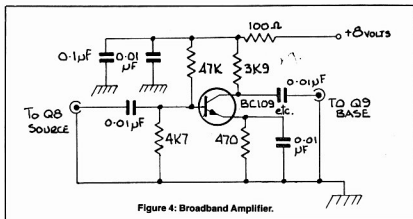
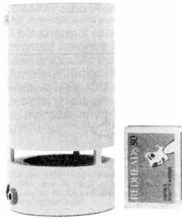


Figure 4: Broadband Amplifier.

PRACTICAL CW RESONATOR

Ivan Huser VK5QV

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I wonder how many readers tried the Beverage CW Resonator described in the April issue of *Amateur Radio*? No doubt with varying degrees of 'success'.

THE RESONATOR DESCRIBED in this article, is the result of some experimentation with acoustic resonance in pipes. Although it is not claimed to be perfect, the resonator does dramatically improve the readability of CW signals and, hopefully, will produce a state of experimentation among CW operators to produce a more effective version.

THEORY!

We have all, at some time or other, blown across the open top of a bottle to produce a tone. The frequency of the tone so produced, depends on the length of the air column and the velocity of sound propagation in much the same way as the resonant frequency of an antenna depends on its length and the velocity of propagation of electromagnetic waves.

The velocity of sound at room temperature (20 degrees Celsius) is approximately 344 metres per second. Assuming that the received CW tone is 830 Hz, the wavelength may be determined thus:

$$\begin{aligned} \text{Wavelength} &= \frac{v}{f} = \frac{344}{830} \\ &= 0.414 \text{ m} \\ &= 414 \text{ mm} \end{aligned}$$

As with antennas, the smallest resonant length of a pipe open at each end is one half wavelength as shown in Figure 1a. Due to end correction (similar to end effect in antennas), this length will be slightly less than the acoustic half wavelength and depends on the diameter of the pipe.

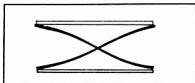


Figure 1a: Standing waves in a half wavelength pipe open at each end.

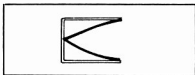


Figure 1b: Standing waves in a quarter wavelength pipe closed at one end.

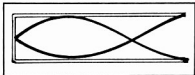


Figure 1c: Standing waves in a three-quarter wavelength pipe closed at one end.

Since our resonant pipe will be closed at one end, a quarter wavelength can be used. This may be calculated as approximately 103 mm for resonance at 830 Hz. In fact, any odd quarter wavelength may be used. The resultant standing waves in a quarter wavelength pipe

and a three-quarter wavelength pipe are shown in Figure 1b and Figure 1c respectively.

The behaviour of a column of air at resonance is quite complex with the end correction generally being determined experimentally. However, as a rule of thumb, the end correction can be taken as three-fifths of the pipe radius. This means that for a 65 mm diameter pipe, the end correction at the open end will be approximately 19 to 20 mm. This is the distance that the speaker should be placed from the end of the pipe.

Since the cone of the speaker is, in fact, cone shaped, this becomes somewhat problematical. However, if the distance is measured from the end of the pipe to the centre of the cone, the error will be minimum.

CONSTRUCTION

The unit is built around a 50 mm speaker and a short length of 65 mm plastic water pipe. Start with about 500 mm of pipe and carefully cut three slots near one end as shown in Figure 2. The slots should be about 10 mm wide and of sufficient length to remove most of the plastic from around the circumference of the pipe, allowing about 3 mm of plastic between the end of one slot and the start of the next.

Make a baffle to suit your particular speaker from 6 mm bakelite, plastic or whatever. The baffle should be a 'tight' sliding fit inside the pipe. Although access to a lathe will be found useful, an acceptable baffle can be made using basic hand tools and just a little patience.

Mount the speaker on the baffle and insert it into the pipe from the slot end, so that the 'front' edge of the baffle is level with the 'first' edge of the slots and facing the longer open end section of the pipe. This should place the centre of the speaker cone at about the correct distance from the lip of the pipe.

Connect the speaker with long leads to an audio signal generator or your rig and obtain a tone of about 830 Hz.

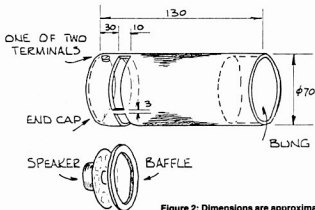


Figure 2: Dimensions are approximate and may vary with individual units.

To find the approximate position of the bung that is needed to close off the end of the pipe, immerse the open end of the pipe in a tall container of water such as a tall bucket or a small plastic rubbish bin. As the pipe is lowered into the water, two points of resonance should be found — one approximately 310 mm or so from the centre of the speaker cone and the second approximately 105 mm from the centre of the cone. The first point is the three-quarter wavelength point and the second the quarter wavelength point. It probably matters little which length is used for the resonator, but it would appear that the three-quarter wavelength results in a slightly sharper resonance². I opted to use a quarter wavelength — that is, the shorter length of pipe.

Cut the pipe somewhat longer than required and insert a close-fitting wooden bung about 20 mm thick into the pipe and carefully adjust it to the position of resonance. A single PK screw is sufficient to hold the bung in place. It is suggested that if the bung is made using hand tools, it should be 'glued' into position using a universal silicone rubber sealant to make it airtight.

The ends of the resonator can now be finished off using a lathe or file. In the prototype, I sealed both ends and then covered each end with green 'felt' contact plastic. This allows the resonator to be used with the speaker facing upwards or downwards as desired.

FINALE

Running a frequency test on the resonator showed it to have a sharper cut-off on the high frequency side of resonance than on the low frequency side. This appears to be due to the fact that the intrinsic speaker resonance is in the order of 450 Hz. An approximate response curve is shown in Figure 3.

In practice, the resonator substantially reduces the high frequency noise such as atmospherics and power leak and, of course, 'peaks' the required tone.

If you did not try the Beverage CW Resonator, I suggest that you try it before embarking on this project — you may be pleasantly surprised.

Notes

- 1 A layman's attempt to explain what is happening.
- 2 This effect may perhaps be explained by the

fact that the movement of the cone is a smaller percentage of the overall length of the longer pipe.

References

- 1 Try This — A Beverage CW Resonator — *Amateur Radio*, April 1987
- 2 Chambers Encyclopedia
- 3 Encyclopedia Britannica

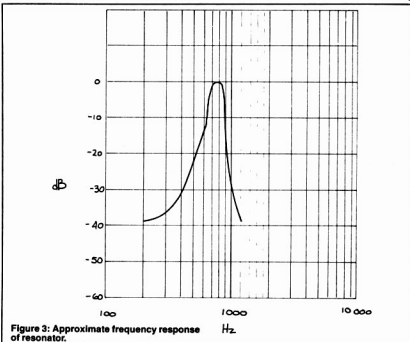


Figure 3: Approximate frequency response of resonator.

DEMAND FORCES MDS SQUEEZE

Due to demand for multi-point distribution service (MDS) licences, engineers from the Department of Communications are investigating a cross-polarised transmission technique to fit more B-MAC channels in the available bandwidth.

So far the Department has received 168 applications for MDS-TV licences in capital cities and regional areas since it called for applications last October.

The services — which will use terrestrial microwave transmitters to distribute video, audio or data to virtually any location except the private home — have been allocated two frequency bands:

Band A: 2076-2111 MHz

Band B: 2300-2414 MHz

Band A will contain five 7 MHz channels, suitable for the PAL format. Due to the nature of the services planned for this band no encryption standard has been imposed by the government. (AAP has had a data service operating in this band for a number of years).

However, Band B is designated for the video and audio entertainment and information services (VAEIS), which will be encrypted by use of the B-MAC format.

Band Capacity

The problem faced by DOC engineers is to maximise the number of channels available in Band B to provide as many services as possible.

As one B-MAC signal occupies 8.75 MHz of bandwidth (including spacing), the DOC should theoretically be limited to allocating 13 channels for VAEIS licences in the 114 MHz-wide band.

But the DOC is attempting to boost the capacity

of the bands by overlapping adjacent signals. This can be achieved by transmitting the adjacent signals on lower and upper sidebands with a 90 degree cross-polarisation, said Colin Langtree of the DOC.

Using this technique, the department has achieved two-channel separation of 13 MHz. The engineers are thus confident of fitting 15 channels into Band B, he said.

But in the field, problems could arise. Apart from multipath propagation (ghosting), the DOC engineers are concerned about another multipath effect that could be caused by overlapping the signals.

The reflection of signals off buildings and landmarks could cause "a reduction in the discrimination between the orthogonally polarised transmissions," he said.

The DOC were conducting field tests in Sydney this April to assess the degree of multipath. If the tests prove negative — or if there is potential for further overlapping — the DOC will modify its spacing arrangement.

If signal reflection is significant, the number of data or audio channels in the B-MAC signal may have to be reduced from Level 4 (six channels) to Level 2 (three channels).

Apart from the doubt surrounding the degree of overlap, the DOC has determined the other engineering parameters, including:

- transmitter stability requirements
- maximum EIRP (23 dBW)
- service area radius 30 km from transmitter site
- typical receive dish size of 0.6m (parabolic antenna or grid-pack) and a noise figure of 6 dB.

The MDS parameters are quite distinct from a typical broadcast service, Mr Langtree said, as they are designed to only provide adequate signals for receivers with a clear radio line-of-sight path.

Manufacturing

For testing purposes, the DOC will use its in-house equipment but due to the unique nature of MDS in Australia, opportunities exist for local manufacturers.

Mr Langtree said the DOC plans to discuss its requirements with electronics companies within the next month. One particular area of concern is providing adequate filtering of the sideband components.

The DOC intends to ask manufacturers for their solutions to finding "the best way to realise the desired result," he said.

Optimistic

However, a senior engineer with one of MDS licence applicants said the DOC was being too optimistic if it expected to cram in extra B-MAC channels.

He believed the effects of multipath interference in an operational environment would require wider margins. This had been the case in the US, where MDS had been operating for many years, he said.

However, it is impossible to accurately predict the outcome until field tests are carried out, as Australia is breaking new ground in this area.

MDS in Band B will be the first use of the B-MAC satellite standard in a terrestrial broadcast environment, so the data the DOC produces could be quite useful to other broadcasting administrations throughout the world.

—From Broadcast Engineering News, February 1987

KEY FOR SUCCESS

John Hawkins VK6HQ
39 Glyde Road, Lesmurdie, WA 6076

What you see at VK4XA is what you get!

Amateurs tend to polarise over contests. They either love them or hate them. Maybe it is the risk of getting hooked on those split-second decisions, the smell of hot transformers, ears ringing with serial numbers and the frenzy of those 15, final torturing minutes!

I was weaned on CW. In the annual Remembrance Day Contest for VK, ZL and P29 call areas, I monitor my contest progress by periodical references to the scores of one special CW operator in Queensland. Hold steady the ratio of my serial numbers to his and I can count on a good Western Australia position.

Imagine, then, how nice it was to be in Brisbane with the opportunity to meet this most consistent and successful CW contester, Russ VK4XA.

If one expects, on entering Russ's shack, to see a vast array of apparatus and an unbleached oblong of bench-top where a kilowatt linear had just been removed out of sight to the linen cupboard one would be totally out of luck. What you see at VK4XA is what you get! Even the bug key is home-brewed. Two TS520s, one a little unwell in the tuning capacitor department and sporting a paper warning label, together with a delightful old AR88 receiver matched with an FL200B for 80 metres

transmit/receive backup complete the station. Outside, the antennas are confined to a suburban block and the tri-bander tip-toes to see over adjacent roof tops.

From whence, then, one ponders, does the magic come?

Russ agrees without reservation that tactics and perseverance are but two essentials in the contest and award struggle. Select the right band for the time of day. Choose whether to call or to risk precious seconds by listening. Decide when to sweep the special band segments for stragglers. Chance a nap. Miss a meal or two. All options in the overall strategy. Even a loudspeaker with a director lessens fatigue and aims the action at the ear, not to the neighbours!

Somehow, chatting over a glass of wine and some Chinese food, Russ's gentleness of character is enigmatic, concealing a latent power-house, ready to spring into action once the gates go up.

Russ's introduction to shortwave came in 1926 at Warrnambool Technical School in Victoria. Through the influence of one Les Kermond, (later to be VK3DX and still active now), self-taught Morse code operator and owner of a UX199 valve receiver, Russ soon had a similar receiver working on 32 metres, listening to the list of commercial station KEL and practicing his own Morse on a home-brew buzzer.

In 1929, 10 metres was launched. Russ soon heard two OZ prefix stations from New Zealand, OZ1AO calling CQ and OZ3AR working VK6BQ and VK6SA for a VKZL first. Actually, at that time, Australia held the OA prefix and England was EG.

January 1929 saw Russ leave home to become a trainee telephone mechanic and at the age of 16 was stationed in Melbourne. "There were still some magneto phones around," smiled Russ. "Especially in Brunswick and Footscray."

The old UX199 receiver continued working and eventually Russ sat for the technical regulations and 12 WPM Morse examinations, passing at his first attempt. On February 4, 1931, he worked VK3RJ, 86 when he became a Silent Key in May 1987, but even then a veteran of eight years amateur radio. Initially, Russ recalled, 32 metres was the go, then 80, 40 and 20 metres. There were also 200 metres where, at the weekend, one was permitted to play music; but Russ gave that one a miss.

Russ's first call was VK3XX and the transmitter a one valve self-excited oscillator. "It was an experimental license," Russ explained. "And every now and then the Department would write, asking what experiments had been done!"

A new Arcturas UX126 valve, with about one watt input helped raise the first VK4 and Russ's QSO score to 100. By February 23, 1931, he had worked ZL3CC on 20 metres and begun to receive "pure DC" reports on his CW. From then on, the availability of components improved somewhat. Some laminations were trimmed and pressed into service as a power transformer. A three-lead rectifier from Raytheon using helium, and some 75 volts 2 uF telephone condensers did not last too long! Coils were wound from quarter inch copper tuning buffed up with dirt and a cloth and then wrapped round a bottle. Glass photographic negative plates and tin foil was used for fixed capacitors and a jar of water with two copper wire electrodes provided the grid leak resistor.

After the war, components became far easier to get but Russ's pre-war equipment limited his best DX to AC8JS (now BY), whilst his contemporaries were working up to 50 US stations a night.

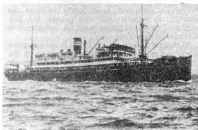
The first contest appearing in Russ's log books was a "Relay Contest" run by the WIA. It started on April 11, 1931 and ended on April 25, 1931. One has to compose 15 20-word messages and pass these, together with messages received, to stations in another State. Each message has to be relayed through six different States after which it became invalid for further relay. The top six scorers were VK3RH, VK4BS, VK7CH (still very active), VK2KJ, VK6CB and Russ VK3XX.

Just prior to WWII. The receiver on the bench at left is an Emmco Vernier dial! Transmitter bottom — telephone condensers at front, adjacent and behind condensers — the HT transformer, hand-cut laminations etc., and wooden clamps. Second shelf houses the home-brew filament transformer. Third shelf, CO FD. Top: PA UX210 about 10 watts. Right: Home-brew multimeter which is still working! (Note the operator's chair!).



Russ had, by then, taken on some unusual saltmining, maintaining lighthouses, and extensive travelling tended to keep him off the air. However, he improved his power and reports by making a COIFD. On August 27, 1939, he had his final contact with VK3IL (OSO number 2453) and handed in his equipment for the duration of WWII. Reminiscing, Russ mentioned how the rig, including the Morse key, all had to go, at a time when 10 metres was the main band and DX was hard to find. "But going back to those days of OA, 32 metres was the band, especially in the afternoons, after school. I often heard EG5ML, EG2NM and other UK stations, all on 10 watts or less, but the band was, of course, free of noise. Max VK3BQ, was a pioneer then in crystals for frequency control. We used to rub down pebble spectacle lenses and, by trial and error, get them to oscillate on 80 metres."

Like so many amateur radio operators, Russ joined the Air Force when hostilities commenced, bringing with him valuable expertise. It was no accident that, whilst declining an instructor's job, he mustered as a wireless electrical mechanic, securing top spot in theory and second top in Morse. "A professional telegraphist," Russ added, "took first place!"



The Macdhui.

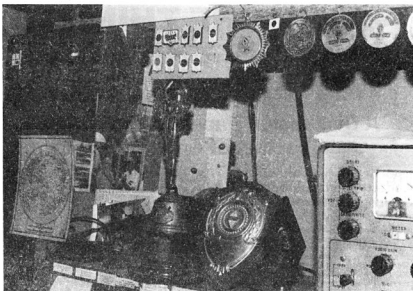
June 1941, found Russ married, posted to Port Moresby, PNG, promoted on the spot to corporal and "thrown in the deep end!" But he survived. An old coastal vessel, the *Macdhui*, which had transported a contingent of 50 RAAF personnel, including Russ to Port Moresby, was not so fortunate. Bombs were soon being thrown around and a year later, 10 people lost their lives in a bombing run and the *Macdhui*, with three direct hits, burned for five weeks, providing an excellent marker for subsequent night bombing, before she finally sank to the bottom of the harbour.

On January 17, 1946, the earliest opportunity possible after WWII, Russ was back on air, 28.512 MHz CW, with a 6V6/807 transmitter and a home-brew copy of an AR7 receiver with plug-in coils. On February 2, 1946, (per Russ's impeccable logs) another 807 was added and the newly-found 45 watts soon produced a contact with W9QMD/KE6. The log then shows an ever-increasing number of W, ZS, VE and other DX QSOs.

By August 13, 1948, 4876 post-war contacts had been notched-up and came the very first Remembrance Day Contest. "The exchange," Russ explained, "consisted of a six digit number, comprising three digits of your own choice followed by the first three digits of the previous number received. Scoring, one point per completed exchange."

That first year VK2 won ahead of VK6. Russ, still as VK3KK, took top CW for VK3 with 228 points. VK3MC was on 191 and Ivor VK3XB (another very active station today) was in there too. VK6RU took top honours for Western Australia with 284 points. "Funnily enough," Russ said, "I've only ever missed two RDs. Last year we had visitors. VK4 won!"

In the 1950s, Russ moved twice for business



Some of Russ's Awards Cabinet.

reasons to VK9XK, finally finishing with VK3XK, which was exchanged in July 1974, for his present call, VK4XA.

Russ now has thousand upon thousand of neatly sorted QSL cards, a mass of awards and 151 243 post-war QSOs in the logs.

He considers his four favourite contests to be the BERU, the VK/ZL, the RD and WPX. The award he most enjoys working for is the German DLD and proudly shows the basic DLD100 certificate from DARC, together with the DLD500. Russ is now awaiting receipt of

the DLD600 sticker. The ultimate is DLD1000.

In these days, when cheating in contests seems to go on, Russ is the first to agree that anyone who bends the rules, wins and still gets satisfaction, must have some sort of a personal problem!

How this quietly spoken, gentle giant of contests does it, and does it so fairly, I still really don't know. But, since VK4XA does not even own a microphone I guess he concentrates on what he does best and gives it his best shot, every time. . .



Russ VK4XA. The loudspeaker director can be seen in the background.

THE MORE THINGS CHANGE, THE MORE THEY STAY THE SAME

John Anderson VK5ZFO
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A Discussion Paper on the Future Organisation of Amateur Radio

Historically amateur radio has been an experimental activity with many successes to its credit.

I have read with interest most of the debate that has raged in the pages of AR and ARA over the Linton/Harrison proposals and have become painfully aware of a similarity to the arguments put forward to every change faced by amateur radio in the 30 years that I have been licensed. All the old saws about encouraging youth, about incentives, populating the bands and defending privileges are there. In all this debate I wonder whether the fundamental issues are being overlooked and whether they have really changed at all.

Historically, amateur radio has been an experimental activity with many successes to its credit. The development of modes of transmission, of antennas and of the value and use of the radio spectrum are well-known. But as the professional development of radio communications in particular and of electronics in general has overtaken the amateur, the Amateur Service has lost its sense of direction. The onslaught of technology, and with it, the availability of ready made equipment, has left many with the idea that there is nothing left to do. Others have lapsed into standard attitudes of resistance to change, both within the amateur ranks and within the Government bureaucracies. This is hardly surprising since, as has been noted by scientists, most of the amateur operators who have ever lived are alive today and a significant proportion of these can still vividly remember the "good old days".

In spite of the massive rate of technological development there is still a place for amateur investigation and contribution. Look at computer games and software. Look at the discovery of trans-equatorial scatter, of aircraft enhancement, of gray-line propagation and the recent theories of propagation by conduction. Speculative? Certainly. Scientific? Perhaps not rigorously, but important contributions they certainly are. Readers can no doubt think of other examples.

High technology does not only mean complexity. . .

The age of experimentation is far from dead. Only the emphasis (and I stress the word emphasis) has shifted from the transmission apparatus to the handling of the transmitted and received signal; ie inputs and outputs. Even so, there is still room for applying the advances of technology to simplify the apparatus so that the tyro (of any age) can build high performance equipment for himself. High technology does not only mean complexity, it can also lead to simplicity if one is thinking clearly.

Recently I took one of my own circuits to a local educational institution for advice, where the professor told me I did not do much with RF these days and referred me to his resident guru. Said guru remarked: "I don't really know why you have come to us. I often think you amateur fellows know more about these things than we do." Experts with a historical bent, like Alan Shawsmith, might like to reflect on the full import of these comments.

Experimentation is not limited simply to the development of apparatus. The application of computers to new modes of transmission is as valid as was the development of SSB. There are

still wide open fields in antenna design, propagation research, and QRP activity. And there is the simple development of operating skills — pure communication — as a worthy objective in its own right, a point not lost on the Russian and Chinese authorities. In these activities, the question of whether equipment is home-constructed or purchased, is quite irrelevant.

Looked at in this way, the essential experimental characteristic amateur radio has not changed — only the means of experimentation are different. The truly basic aim of effective communication by radio has remained unaltered throughout amateur history, whether by CW, by voice or by computer aided systems. In this sense, what is really different in the 1980s compared with the 1950s.

Similarly, people have not changed. We all still aim to be healthy, secure and able to do our own thing. However, the economic environment and the processes of Government have changed and continue to change with increasing rapidity and groups within society must be prepared to adapt to these changes if they are to survive. Of particular current interest to amateur radio is this regard are the questions of our licensing system and the qualifying examinations. Later I will propose a way in which these may be reorganised, but first a few basic concepts must be examined.

1. The Aims of the Amateur Service

All the various listings of aims and objectives fall into four categories:

- (a) to advance the state-of-the-art of radio technology and radio communications.
- (b) to make full use of the allocated radio spectrum.
- (c) to communicate.
- (d) inherent in these — to educate, whether by formal classes or by self-education, as a spin-off from the other objectives.

These basic aims and objectives have never changed throughout the whole history of amateur radio.

2. The Nature of the Amateur Operator

Amateurs themselves fall into four groups:

- (a) New entrants into the Service (who may be young or old), who have limited skills, knowledge and experience.
- (b) The Communicators. These range from those who are attracted by the convenience of "wire-less" communications who are satisfied with limited power and channelised frequencies; eg the CB enthusiast, through the rag-chewer to the DX hounds. The technical intricacies of the radio apparatus does not rate highly with this group — it is a means to an end.
- (c) The High-Tech Whiz-Kids whose interests lie in modes of transmission and/or propagation and for whom the transceiver is merely one element of a chain of apparatus which will often include a large computing component. This is the group which will be operating at the leading edge of technology, particularly with new modes of transmission.
- (d) The traditional amateur experimenter who likes to have at least part of his station home-built and who will be continually or spasmodically tinkering with it, and, who at various times, will be interested in some or all aspects of radio communications.

3. The Nature of Administration

Herein lies one of the major problems themselves, and particularly their representative body, the WIA, which I will discuss later.

Every large organisation, be it industry or government, runs the risk of becoming a slave to its bureaucracy with all the regulations and resistance to change that goes with it. The WIA and DOC are no exceptions, although, to be fair, steps are being taken to deal with these problems.

In this regard, I propose two principles:

(a) by analogy with thermodynamics, disorder is the natural state and consequently the more one attempts to impose order, the greater the proportion of ones resources must be committed to maintaining that order.

(b) Human nature is such that it is always more productive to make it easier for people to do the right thing than it is to get up and operate procedures for stopping them from doing the wrong thing.

Our taxation system is a striking example of what can happen when these principles are ignored.

Too often bureaucracies take the negative role of controllers rather than the positive role of good administration, which aims to facilitate and guide correct actions. Being positive according to my two principles leads to simpler administration, something which is long overdue in our licensing and examination systems.

Good administration requires a judgment between the costs involved in the first principle and the risks inherent in the second. I believe it is just such a judgment that has led the DOC to propose the devolution of the examination system.

Our present system is cumbersome, costly and time-consuming both for the candidate and the DOC. It is only the conservative wish to control that, in the past, has kept the examination system in DOC hands. The Department of Agriculture does not examine its Field Officers, Treasury does not examine its economists nor Telecom its engineers. So why this need for DOC to examine amateur operators?

The DOC must certainly set standards and supervise their application, as must every user of qualified people. But there is no reason why they should be so deeply involved in the education and examination processes. This should be left to people in the WIA and the education system. I will discuss the means of doing this later.

4. The Nature of Regulations

As with any limited resource, regulations are required to ensure that those resources are used to the best advantage of the community. In the radio field, regulations are needed for the following reasons:

- (i) to minimise interference
- (a) from overcrowding; eg by frequency allocation
- (ii) from mutual interference between users; eg by spectrum planning
- (iii) from general interference (BCI, TVI, QRM); eg again by spectrum planning
- (b) to ensure adherence to technical standards;

eg SSB, RTTY, TV, etc. These are aimed at making communications easier by preventing a plethora of emission systems. It does not matter

what the standards are as long as they exist and as long as it is possible to add to them or change them as technology advances.

(c) to ensure that people know what they are doing. Licence testing is essential in managing interference and standards regulations.

5. The Levels of Competency Required

There are many activities in or society where licensing by examination apply. The most familiar is the driving licence where one must show a knowledge of the rules of the road and demonstrate competency in handling the class of vehicle one is to drive. Similarly, in aviation one obtains a basic licence as for driving with endorsements for aircraft type and for activities such as night flying or instrument rating. More complex aircraft require more exacting tests.

The point is that there are well accepted principles of graded licences with endorsement for special activities that could well be applied to the amateur service. The key is that people must prove that they know what they are doing.

Bearing in mind the discussion so far, a consideration of the amateur service shows that a range of skills is involved.

(a) **Appliance Operation.** All that is needed here is sufficient knowledge to be able to assemble a station from a selection of commercial apparatus. This group is typified by the CB enthusiast but could include aspects of amateur radio such as the social communicator and those interested in digital modes. Licensing would be characterised by

- use of commercial channelised equipment
- limited power and frequencies
- endorsements showing an appropriate knowledge of characteristics of the bands and modes in use

(b) **Limited Experimental.** This is covered by the present novice licence. Note that the novice examination is such that it would allow for the basic appliance operation as described above. Extended privileges could be gained by endorsement, for example

- mode and band characteristics as per the appliance operator
- 12 WPM CW allowing full use of the 80, 15 and 10 metre bands at novice power levels
- general theory for AQLCP privileges

(c) General Experimental.

- (i) current AQLCP (all frequencies)
- (ii) current AQLCP (VHF/UHF frequencies)

One important endorsement here for the AQLCP is five words-per-minute CW allowing access to the novice bands plus the 28.880 MHz VHF falson channel.

Note: It is vital that the AQLCP be of internationally interchangeable standard.

(d) **Advanced Experimental.** This can be similar to the USA Extra Class with high power privileges and the lifting of all restrictions other than those imposed by international agreements. A high level examination would be required.

Some general points needed to be made at this stage.

The above classification recognises what is actually happening on the amateur bands and has the seeds of a revised licensing system. With the exception of a question bank for the advanced category, the examination system can remain unchanged, since the endorsement proposals would require passing sections of current examination papers. A full set of endorsements would then be equivalent to AQLCP.

The endorsement system should create some incentive to upgrade by giving people a taste of what is possible under restricted conditions. Further, as a full set of endorsements is equal to AQLCP, people can upgrade their licences at their own pace as their interests develop.

CW has not been mentioned so far. Paradoxically, while CW is the simplest mode technically and is the most efficient form of transmission, it is also the mode requiring the greatest skill. This will remain so until computers can match the complexity of the human brain. Because of these dual characteristics of simplicity and skill CW should remain a requirement for full amateur privileges.

Amateurs have access to a wider range of frequencies and power levels than do most

professional experimenters. Indeed only the Defence Forces have wider privileges. This places a great responsibility on the amateur service to use their allocations for the best purposes possible — including, but not necessarily requiring, experimentation. A reasonable level of proven competence underlines the value of our privileges and this should not be reduced below a minimum novice level, except for pure appliance operation.

6. The WIA

We live in a complex age in which the use of lobby groups is a virtual necessity. Ministers and their Departments simply do not have the time to gain an assessment of public opinion in any other way. For amateurs, this process of contact can only be through the WIA if it is not to be fragmented, but effectiveness of the WIA is limited by the fact that only half the amateur fraternity are financial members.

Why is this so? Journals such as ARA have suggested many reasons but I feel they miss one basic fact. That is, the WIA as an organisation does not pay attention to that item in the Amateur Code which states: "The amateur is friendly". In three of the four States in which I have lived and attended meetings, I have had to look carefully at myself to see whether I was visible. Nobody spoke to me — nobody. From time to time I have made various attempts to be noticed but have received prompt and courteous replies — followed by silence. If I followed up I have been met with a latent hostility which gives the impression "We are looking into it — we know best!"

These experiences, together with a reading of everything published on WIA activities, leads me to the conclusion that the WIA is typical of most active voluntary organisations. For those who are "in" the WIA it is marvellously friendly, active and effective body. Those who join seeking acceptance are faced with all the barriers of a closed shop. One of these barriers is the expectation, first to be well-known and secondly to become totally involved, an excessive commitment which scares people off. So, until now, I have kept my peace, and paid my dues, as I believe that the WIA is essential to the survival of amateur radio.

Survival is not a word I use lightly. Governments everywhere are under the dual pressures of commercial lobbying for additional frequencies and the revenue attractions of the amateur allocations. The USA amateurs have just lost two megahertz of their 220 MHz band and UK amateurs have seen a report go to Whitehall stating that nowadays there is no justification for the amateur service and recommending that the UK Government work through WARC to eliminate it. Closer to home it is being said that the 70 centimetre band alone is worth \$1 million in licensing revenue.

Against these pressures, tradition and altruism count for little. Governments will only listen to strong, effective and united voices from community interests. United we stand — divided we fall. The ease with which the ALP in the 1950s and the Opposition parties in the 1980s have been reduced to impotence is an object lesson. Formation of a second amateur body is a recipe for disaster. The answer to dissatisfaction with the WIA is not to replace it but to reform it from within, to make it more attractive to potential members, to make use of the talents of its membership and to develop policies and submissions based on present realities as well as on traditional opinions.

What the WIA must do now is to review its approach to what is termed these days as "Human Resource Management". As it now operates, the WIA has a very limited knowledge of its membership and, as a result, makes poor use of its full potential. Amateur radio is no ordinary hobby. Those prepared to go through the examination and licensing system have an above average level of knowledge, dedication and enthusiasm. Also, amateurs come from all sections of the community. Thus, the potential range of skills and networks of contacts that can be drawn on is immense. What could be done if this resource was fully utilised makes the mind boggle!

Specifically, the WIA must consider the following moves:

- (a) Adopting a fully professional, responsible and effective approach that can confront purely

commercial interests on their own ground and can accept challenges such as examination devolution as they arise.

(b) Making new members feel wanted by personal welcome and on-going personal contact, both on and off the air. Initially, at least, this must involve Divisional Committee members. They are the leaders and must set the example.

(c) Getting to know the membership and their capabilities. In addition to general calls for help, members with specific skills should be sought out and invited to take part in WIA activities in a less onerous fashion than at present. This move is as essential aspect of the licensing and examination systems — propose later.

(d) Ensuring that all offers of assistance and ideas are obviously welcomed and personally followed through to completion. Ideas and initiatives arise from individuals throughout any organisation and this resource must be carefully cultivated if the organisation is to remain healthy.

7. Examinations

The normal system for qualification in any field is for a student to study in, and graduate from, an institution whose course standards are approved and monitored by some regulatory body. For trades courses this process is carried out by the Apprenticeship Commission. For professional qualifications, such as Accounting, Engineering, Law, Medicine, etc., the standards are set and maintained by the relevant body representing that profession.

The detail of the administrative processes varies considerably, but the key points in common are that there is extensive consultation in the process of course design by educational institutions, that the professional body is involved at all stages and has definitive say on standards. Also, it should be noted that, in the vast majority of cases, this control of standards is carried out by the voluntary effort of members of the profession concerned.

Now, the WIA prides itself on being a self-regulating body representing the amateur service. If this claim is to be credible, then the WIA must accept the same responsibilities as every other professional body, in particular, that of regulating the standards of qualification of its members. This is the challenge presented to us by the DOC.

The arguments thrown up against accepting this challenge come in three forms:

- that since the WIA is a voluntary organisation it could never provide the manpower required, — that the WIA does not have the expertise, and
- that the self-interest of educational institutions would lead to a lowering of standards.

The first objection does not stand inspection as all current WIA activities are run by voluntary labour and, in the past as each new activity has arisen, people interested in them have come forward. AMSAT, Region 3, Repeaters, Customs Byline Inspections, and so on, have all attracted those with that particular interest. Certainly, the WIA could do more to identify and encourage the talents of its members, but experience has shown it is there and properly handled, it is willing and able.

The second objection is frankly insulting. The WIA membership represents all sections of the community with a very wide range of qualifications. The expertise is there and can be called upon to do what is required.

The third objection has some superficial merit, but in practice, where proper accreditation and monitoring systems, are in place it does not occur.

Further, educational institutions jealously guard their regulations which they are unlikely to compromise by turning out inferior graduates. Indeed, the problem really is preventing standards from becoming too high, which has already happened with the novice examination.

So, the question is not whether the WIA, the clubs and TAFE or other colleges can handle the devolution of examinations, but how the process should be handled.

At present, the system is purely regulatory. The DOC, after consultation with the WIA, details the content of the examinations, administers the examinations. DOC now proposes an accreditation system where teaching/examining bodies are vetted and thereafter their results are accepted. While this is an improvement, it still in an area of

expertise which it is not really equipped to handle, viz education.

Before outlining an alternative solution, some terms need to be defined.

Accreditation: the process for checking that staff and teaching facilities are adequate and that the detailed curriculum meets requirements.

Monitoring: the process of checking that standards are maintained and that any changes made are in line with approved policies.

The proposed system is based on the following assumptions:

(a) That by analogy with general professional practice the WIA assumes responsibility for the accreditation and monitoring the teaching and examination of amateur operators.

(b) That the DOC, as the regulatory body, has the definitive say in licensing arrangements and qualification requirements.

(c) That the operation of the system be through the Divisions, their clubs and educational bodies such as State TAFE colleges.

(d) That overall control be through the central WIA organisation of the examination question bank, and

(e) That once the system is in place the DOC would issue licences "on presentation of evidence of standing satisfactory to the WIA as approved by DOC".

The organisational structure that I propose is as follows:

1. Australian Amateur Radio Service Council

FUNCTION: POLICY DETERMINATION

MEMBERSHIP: DOC and WIA. As regulatory authority under its Act, DOC would necessarily have the final say either by casting vote or right of veto.

The council would operate through a system of subcommittees and consultants which would allow for specialist input; eg education, and interested opinion; eg from Linton and Harrison. It would need to meet infrequently, say, once or twice per year and would formalise all DOC/WIA/Amateur contacts that currently exist.

2. WIA Licence Committee

FUNCTION: TO MANAGE THE SYSTEM

MEMBERSHIP: Federal Education Officer, Federal DOC Liaison Officer and Divisional Representatives.

The full committee would meet once per year prior to the Federal Convention and operate generally through a Headquarters Executive Committee. Subcommittees would handle the maintenance of the prime examination question bank, cross-check accreditation procedures and spot check examination papers in order to monitor standards. This committee would also be the body through which proposals for change to the system are channelled to the amateur service council.

3. Divisional Education Committees

FUNCTION: TO ADMINISTER THE SYSTEM

These committees would have the responsibility of carrying out the detail of accreditation, monitoring and issue of examination papers to colleges, clubs and individuals as required. They would only cross-check the marking of a random selection of papers and forward samples of these and doubtful accreditation cases to headquarters. The only situations where these committees would actually run examinations are in remote areas where clubs and colleges are not available. They would issue certificates in the name of the WIA for presentation to DOC for licence application. Further, the committee chairman would be the Divisional Education Officer as well as being the local WIA/DOC Liaison Officer.

This system as I propose it does a number of things.

- (a) it allows the WIA to become a more responsible, professional organisation
- (b) it frees DOC from the albatross of running an education system
- (c) it frees the examination process to the benefit of potential entrants to the amateur service
- (d) it parallels and formalises relationships which already exist between the WIA and the DOC

(e) it provides a framework in which the structure of the amateur service can evolve with future changes, both in technology and society.

Initially, because this proposed system is built on existing arrangements, the only visible changes would be that the examination system would be more accessible and the process of licensing would become more rapid.

In the longer term, because of the inextricable relation between licensing and examinations, some very important changes become possible of vital importance to both the DOC and the amateur service as I will now discuss.

8. An Integrated Licensing and Examination System

In the earlier sections of this paper I have reasoned that the range of amateur service licences should be extended and the process of licensing over responsibility for the examination system. Both are made necessary and are possible by changes in society, governments policy and technology.

However, it should be noted that two aspects of the current system, which are also central to my proposals, remain unchanged. They are:

(a) the present novice, limited or full licence levels

(b) the current examination papers in their multiple-choice question form.

Now, by freeing the examination system from all the inherent (and justifiable) restrictions of a government department, the WIA, through its network of accredited organisations and individuals, will be able to provide candidates with examinations at any reasonable time and location that may be required.

Further, such a more flexible system will enable the present examinations to be offered in sections as required by an extended range of licence options. As these sections are accumulated by candidates they will progress through the licence structure at their own pace as their interests develop.

The integrity and security of this arrangement would be maintained by having a large and evolving question bank with randomly selected questions for each paper sent out. Only the actual papers set require attention to standard processes of security and confidentiality.

Looking at the discussion on licensing, there appears to be a need for a low level of entry to the amateur service, provision for those interested only in digital modes and for those who could usefully use higher power. Under the structure of licensing and examination, I have proposed these can readily be accommodated as in the following example. Here, it is assumed that a novice level

set of questions relevant to VHF propagation, TVI, etc is added to the current question bank, as well as a set covering high power and high speed CW. Questions relating to digital modes to be a separate section of the current AOCF theory examination.

1. Communicator — Low power, limited range of frequencies embedded in an active section of one VHF band along the lines of the current HF voice segments.

It may be seen from Figure 1 that there is a natural progression in the arrangements. It is possible to follow ones own interests without sitting more examinations than is necessary. Further instructional courses can be arranged so that candidates can get on the air at an early stage. This gives the practical experience of radio communications, that is an essential part of generating the incentive and enthusiasm to proceed to a full licence. The advanced class gives the serious amateur the opportunity to carry out work of genuine scientific value.

There is an advantage to the DOC too in this system if the letter given in the last column of Figure 1 is added to the amateur call sign, either to the prefix or to the call letters. A call sign would be allocated on the first application which would remain with licensees for as long as they remain licensed in that State. At that time, and revised as each examination section is passed, DOC would notify the licensee of his current privileges and the letter or letters he must use in addition to his call sign for the mode or bands used. This system can be readily computerised and would reduce the administrative work required considerably.

I have not gone into great detail here, but enough, I trust, to illustrate that if the framework of licensing and its interrelated examination system is properly constructed, it can cope with changes to the licence structure and the needs of the amateur service as society changes and as technology advances. If the structure is right now it will carry us through to the next century.

10. Conclusion

In this paper I have set out to analyse the Amateur Radio Service as it now stands and, what changes are necessary to modernise its activities, have done this because I am concerned that we will only get the one opportunity that is given us now to firmly and permanently establish our rights and responsibilities as a valuable and professional activity in radio communications. I fear that if we do not take up the challenge, commercial and political opportunism will take its course and the amateur radio will eventually cease to exist. The ominous signs are already appearing in the US and the UK, but strangely not in China or Russia.

LICENCE	EXAMINATION									
	NOVICE		AOCF		ADVANCED					
	REGS	THEORY		THEORY	THEORY	DESIG				
		VHF	GEN		GEN		CW 5 WPM	CW 10 WPM	CW 15 WPM	
Communicator	X	X								C
Digi Endors	X	X		X						D
Novice	X		X	X						N
VHF Endors	X	X	X	X						V
Digi Endors	X	X	X	X	X					B
Limited	X			X	X					L (VHF)
Novice Endors	X			X	X	X				N (HF)
Full	X			X	X	X	X			—
CW Endors	X			X	X	X	X	X		—
Advanced	X			X	X	X	X	X	X	A

Figure 1: Possible Amateur Licensing System.

where the contribution of the amateur service to the community is well recognised (but, perhaps not for the reasons we would like).

I have examined changes which are desirable in the licensing system, changes which are necessary in the examination system as a consequence, and changes within the WIA which must occur to make these possible. In this I am reminded of the old adage:

Give us the courage to change what needs to be changed,

the tolerance to accept what cannot be changed, and the wisdom to know the difference.

With respect to the amateur service, most of what is required to revise the system is already there. It only needs a fresh way of looking at things and a more open approach in the organisational field to achieve what is wanted at any particular time.

Given this, some goodwill and remembering the Amateur Code of Ethics, I am sure the amateur service will not only survive but become a real force for good in our community.

Change is inevitable. But, if the basic foundations of philosophy and organisation are sound, most changes are only superficial. Then, the more things change, the more they really do stay the same!

Improved HF Broadband Wire Antenna

We are indebted to Gerry McCulloch VK2BMZ, for bringing to our notice an article in "Electronics Letters" of May 12, 1987. It reports on work done by APC Fourie and BA Austin at the Witwatersrand University, Johannesburg, South Africa.

Briefly, they based their work on the type of loaded broadband dipole described in a number of references, of which "Amateur Radio" for April 1982, is one. This earlier antenna uses lumped units of parallel L and R for loading (16 μ H and 330 ohms) at about 2/3 of the distance from the centre feed point to each tip of a multi-wire dipole, 40.6 metres in overall length. Its worst SWR is about 2.6 at around 18 MHz, worse than 2.0 between 12 and 23 MHz, but better than 2.0 from 3 to 12 MHz and above 23 MHz.

Fourie and Austin realised that as the element lengths change (in terms of wavelength) each side of the loading units, there will be unwanted resonances at some frequencies (notably 18 MHz) which cannot be controlled fully by the loading resistors.

Effectively splitting the antenna into two parallel dipoles in X formation (using single wire, much simpler construction) with four loading units (each 32 μ H paralleling 600 ohms) they made it possible to "stagger" the loading and resonance effects by placing one set of loading units at a different distance from the feed point than the other set.

Whereas in the earlier antenna the distance to the loading units is about 13.5 metres, the improved antenna uses one pair at this distance, and the other pair further out, at 17 metres.

This results in SWR exceeding 2.0 only over a narrow range (about 22 to 26 MHz, and above 28 MHz) which is considerably better than the earlier version. It is also found to have rather better efficiency over most of the spectrum. The only segment where the earlier type is more efficient is the region in which the SWR is worst!

The angle at which the dipoles intersect is not very critical, but has a small effect on the average impedance at the feed-point. If intersecting at 90 degrees the optimum feed-line Zo is about 400 ohms. This rises to about 500 ohms when the dipoles are nearly parallel at 5 degrees.

All the tests and measurements were carried out at an antenna height above ground (at the centre) of 8 metres. An inverted-V type of configuration is indicated, but end heights above ground are not stated in the report.

WHY NOT?

Alan Shawsmith VK4SS
35 Whynot Street, West End, Qld. 4101

Roy VK3XY, was intrigued by the street name of Alan VK4SS, a regular contributor to AR. Roy wrote to Alan and asked if he knew how WHYNOT Street got its name. Following is Alan's reply to him.

There is no doubt that certain place names evoke the imagination. The street in which I've lived for so long certainly does — and well it might, for some of the happenings it is recorded in both early and contemporary Brisbane history.

Being a lover of rhetoric (the "fair-dinkum" variety of course), I have had a lot of fun with those inquiring souls who ask, "Whynot Street, that's funny, how'd it get that name?"

The most recent query and catalyst for what follows here came in the form of a letter, dated February 24, 1987. Quoted verbatim it says:

... also, I feel sure an article by you as to how your street came to be called Whynot — written in your unique humorous vein — could be of great interest to your many fans, including yours truly. Why Not? Roy VK3XY. I wonder ...

Anyway, at the risk of boring one and all, let me start where it all began. My maternal grandfather arrived in Brisbane town (circa 1880s). Climbing a hill not far from the Southbank, he gazed back to where the city now stands and exclaimed, "This would be a fine site for a home!"

"Well, Why Not," was the reply of his young bride, "you're in the sawmilling business and we have the timber — so Why Not, here!" At the first available land auction he stood with a handful of others and bought a block of his choice. At the end of business the auctioneer is alleged to have pointed down the dusty track and said, "We'd better give the road a name. Any suggestions, folks?"

"Why Not call it this, Why Not call it that," came various replies.

"Well, Why Not WHYNOT Street," the official said. None dissented.

Little did the 'Old Boy' know just what a magnificent site for working DX he would bestow upon his grandson (VK4SS). The modern beam has reduced this advantage — but in early days (1930s), it was possible to Work the World from Whynot Street, on the proverbial piece of string.

The connotation that goes with the words 'Why Not' is one of casting caution aside, taking a little risk even for a moment. In the female vernacular it's "letting one's hair down," when used in light conversation it is anticipatory.

I ran my own business for many years. Naturally this brought me into contact via the twin with the office girls of other business men. Sooner or later the familiar question would arise, "Whynot, that's a funny name for a street."

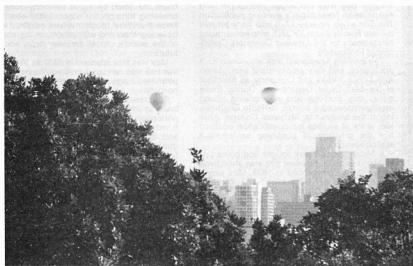
"Yes," I'd say, "and there are some funny people in it. Want to hear a story?" Few resisted. Many years later I'd hear my sons chattering up their young ladies with the same old spiel.

In the 1960s, the USA was convulsed by race riots. Here in Whynot Street, two groups of different ethnic origin fell into disagreement over the location and use of a building. Journalists beat up the "storm in a teacup" into a racial conflict. The story came out in USA newspapers under the heading "Little Rock Arkansas transported to Whynot Street, Brisbane." So, for a few days at least, the residents basked in the glory of international focus.

Some years ago a Canadian Mountie informed me he'd seen a street named Whynot somewhere on his beat of 1000 square miles — he'd check it out and let me know. I'm still waiting. In VK there must be streets or places called Whynot (anyone who knows of one might care to drop me a line); however, there is only one in the Brisbane Refidex. Also, mail posted from overseas to Whynot, Brisbane finds me.

An end of an era is now at hand. Developers have their eyes on this small hill with its city views. The Council is about to declare it no longer 'Urban' but 'City Zone.' Parking meters slowly approach Whynot Street, EXPO 88 is rising nearby and so are other building complexes.

Man-made QRN is now almost constant. Power lines that were once quiet now carry sizzle and crackle from HT leaks. Sensitive, unshielded electronic gear in surrounding houses and flats are beginning to pose a TVI and RI problem. Whynot Street is no longer an ideal site for DXing. Soon VK4SS will have to hang up his "fones" and put away the key — but in the meantime, Why Not put the Whynot Hill to good use and keep on working DX. Give me a good reason Why Not.



View from the Sundeck at 35 Whynot Street, Brisbane City with Hot-Air Balloons above taken at 6 am, November 1986. (It may not

look high but there is a sweeping panoramic view from Mount Cootiba in the west to EXPO 88.

In excess of 160 people from all walks of life assembled in a small crematorium chapel to pay their final tribute to G Maxwell Hull, an esteemed friend of long standing, with whom they had shared many varied interests. Some of the gathering had known this gentleman for over half a century.

Those present were led through an account of Max's life by Brian MacInerney, a Funeral Celebrant, who, although unknown to each other, spent three decades in an allied profession to Max as an announcer, copywriter and later a producer with the Australian Broadcasting Commission.

In the opening remarks of the service Brian said "I hope Max is aware that we're recording this service on the best portable gear we could find. I hope he agrees that we think it appropriate to record it all for posterity. After all Max was a great recorder of events. I don't mean simply as an Audio Engineer. In that field he was tops, sparing no expense and effort in the pursuit of perfection."

Max was born at Moonee Ponds, an inner Melbourne suburb, on July 24, 1916. The precise time is not known, but his twin brother Lloyd followed one minute later. Max and Lloyd grew up sharing a happy childhood with their brother and sister, Graham and Noel. Max's childhood and adolescence was a happy balance of urban and country life. A well renowned Guest House in the mountain holiday resort of Marysville, was built and owned by the boy's grandfather and this is where they discovered the pleasures of hiking, fishing for trout and even waggling school for a swim in the cool waters of the Taggerty River, a local mountain stream.

However, it was not all play for Max, as at an early age, he learned work was necessary to achieve his goals and he financed the building of his first one valve set by selling vegetables from his personally nurtured back garden. The experience gained on the one valve set was expanded whilst attending suburban Box Hill High School where he selected wireless for the mid-week hobby group and undertook the successful construction of a Shortwave Receiver, audibly hearing his first overseas phone station.

Upon leaving school, Max was employed as a Copy Boy with the *Argus* newspaper and Australasian Newspaper's evening publication *The Star* when he was 17. It was here he met the late Ron Williams VK3ZD, who encouraged him to study for the Amateur Operators Certificate of Proficiency.

The evening newspaper was withdrawn from publication and new employment was gained with Arthur J Veall and Company, as Manager of the Mail Order Department. During these duties this studious and enterprising young man commenced a course in Radio Engineering at the Melbourne Technical College. After two years of studies his qualification enabled him the privilege of obtaining an amateur station licence.

A better position was sought and gained at Healing's in 1938, however this was short-lived as hostilities commenced in 1939. Max joined the Army and served a term as a Wireless Operator in Third Division Signals later transferring to the Royal Australian Air Force where he was initially mustered to train as a Wireless Operator (Air). On the completion of the course, promotion was imminent as was the posting as an instructor in Morse code at the RAAF Wireless Airmen's School, situated at Parkes, New South Wales. This posting lasted for two and a half years, the school was phased out and Max was posted to the RAAF Marine

Section as a Wireless Operator on the ketch 0159 *Myrtle Burgess*, operational in the waters of Papua New Guinea. One year at sea in such waters is idyllic by today's standards but highly dangerous during that period. His last war service posting before discharge, with the rank of Flight Sergeant, was to the Albert Park Barracks in Victoria.

It was during a Services dance in October 1945, that Max met Gwenda, a lady who was to become his wife. Brian succinctly relayed to the mourners in the words "... he met Gwenda. It must have been love at first sight. They became engaged in July 1946 and then on September 27, of the next year, Grey Dove married Blue bird and so consolidated a deep and loving relationship that spanned close to 40-years. For all that time they were good companions, good friends who worked hard to make a good life for themselves and a better one for their children, Diane and Malcolm. He relished their presence, their skills, their achievements. His only regret, in later years was that he didn't spend enough time with them. But he made up for that with his grandchildren, Adam, Kym and Andrew. They were the collective apple of his eye and he loved them more than he could say. Earlier he had rejoiced when Diane married Gary and Malcolm married Cheryl. Max truly felt that he had gained a son and a daughter."

Upon discharge, this young but experienced engineer, returned to his pre-war employer, A G Healing Pty Ltd. One year later, he joined William Willis and Company, a family company established in the 1860s, located in the centre of the city of Melbourne, which was renowned for impeccable trading as Locksmiths and for the manufacture of fireproof safes and strongroom doors. Previously this company had been managed by Wallace George Hull, Max's father and before that, George Edward Hull, Max's grandfather. A hard act to follow but this young perceptive man, with a love of history and a pride with links of the past, diversified, and introduced new lines to the retail outlet, electronics, in Bourke Street and later Elizabeth Street, Melbourne.

David VK3ADW, the WIA Federal President's, association with Max goes back to those days when, as a student during lunch hours, he could be found on many occasions browsing through the store. Little was he to know then how much involvement they would have together, and with others, in the shaping of the world's oldest amateur radio society's future!

Max was first licenced in 1937 as VK3ZS but this call was not used until amateur radio was permitted again after the cessation of hostilities.

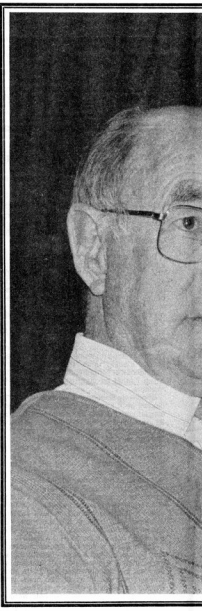
This amateur was more interested in 'home-brewing' than chatting and with the trait of perfection and an inquisitive nature, his homemade equipment was a sight to behold and listen to, at all times being broadcast quality plus. Some of Max's equipment won first prize at the All Models Exhibition, held at the Exhibition Buildings, Melbourne, in 1955.

Involvement with the Wireless Institute of Australia, commenced a much earlier than his appointment as Federal Secretary in April 1950, an office he held for four years. This appointment commenced 37 years of continuous honorary involvement in the Federal sphere of our society. Relinquishing the Secretary's position he accepted the appointment of Federal Vice-President and Federal Publicity Officer. From 1958 to 1961 and 1965 to 1967, Max was Federal President, retiring after the Sydney Federal Convention, held over Easter

VALE

MAX HULL

Passed away



MAX

LL VK3ZS

July 28, 1987



1968. In 1962, Honorary Life Membership was conferred on Max for his service to the Institute and the hobby he dearly loved.

Not one to rest on his laurels, and with his interest in history and to preserve and make a record of our hobby he assisted the then Historian, the late George Glover VK3AG, and in 1970 took over the role as Federal Historian, a post he held continuously until his death.

Max was a "great recorder of events", not only in the audio field, but he was also a master at recording events on film and making notes of anything that "attracted his attention." His meticulous eye for detail and interest in history certainly assisted him in his Historian role.

During his 37 years involvement with the WIA, he, with other Executive members, represented the WIA on the Royal Commission of Television, which set the standards, before its introduction in Australia during 1956. Also during his presidency, due to his tenacity, a number of major events occurred in our Society's history, such as the late John Moyle VK2JU, being appointed an observer in the Australian Delegation to the 1959 ITU World Administrative Radio Conference (WARC 59) a time when pressure was being exerted to release amateur frequencies for commercial enterprise. He was a driving force in the campaign for justice in Frequency Allocations for the amateur service in Australia, culminating in the Huxley Inquiry.

This perceptive amateur was one of the delegation who headed the initiative of the WIA, for the formation of a IARU Region 3 Association. All society's within the boundary were extended an invitation to attend a meeting to be held in conjunction with the 1968 Federal Convention. It was fitting that Max was a member of the initial Secretariat of the newly formed Region 3 Association, which until it found its feet, was assisted under the 'umbrella' of the WIA.

Max, was a thorough researcher. All of his information was initially kept on neatly typed cards until he recently acquired a small computer, which he initially found harder to tame than his boxes of catalogue carded notations, which had grown progressively through the years and contained a wealth of knowledge. Never daunted, he did tame that computer and taught himself a new language. However, the cards were still used as a resource for a vision that he had nurtured for the WIA. That vision was a world-wide recognition of the Society's 75th Anniversary and no better vehicle could have been chosen than the 75th Commemorative envelope, issued by Australia post.

This quiet achiever was a stalwart to the Anniversary Committee from its inception. Max compiled biographies of the WIA for publication in *Amateur Radio* and ably presided over the WIA's 75th Anniversary Dinner in the role of MC.

Versatility was a part of his life, and if there was a job to be done he would do it. He wrote the *History of Amateur Radio* and the *Wireless Institute of Australia* (Refer p21 *Amateur Radio* March 1970) to commemorate the Cook Bicentenary, sowed the seeds for the formation of The Radio Amateurs Old Timers Club, becoming a founding member, a Past Chairman and Co-Editor of its journal *OTC* at the time of his death. Max was also a popular Master of Ceremonies at most of the RAOTC social functions.

Max was a business man with forethought and he decided to move the business of William Willis and Company closer to his home so that his premises and customers would benefit from a 'village-atmosphere' way of life

rather than a busy 'concrete' jungle of the city. The move occurred in 1970 and he built up a clientele of people that liked service combined with a chat. He thrived on being able to assist anyone or everyone with a 'thing-a-me-jig', generally underestimating the price and making a sale at a loss. Brian, in his eulogy remarked "but he didn't mind that, did he? Because joy in fellowship and being kind, compassionate and willing to serve, was the name of the Game played by Max Hull".

Unknown to many was the fact that, Max with his inquiring mind and quest for all forms of knowledge, had a deep interest in Genealogy. He was proud to have validated attachment to the past and his family links with the pioneers of our country, including the convicts.

This man of many talents, had strong ties with Festival Hall, built on the site which was formerly known as the West Melbourne Stadium. Max's interest in electronics encompassed the audio field and he became Sound Engineer at Festival Hall in 1956. He also built his own sound system for the Olympics. Since that period he has served and worked with such performers as Frank Sinatra, Sammy Davis Junior, Judy Garland, Vera Lynn, Peter, Paul and Mary — to mention but a few.

Max was still working at Festival Hall until his death, and in many ways it was appropriate that he should die doing the job he loved — at Festival Hall providing the sound systems for a *Crowded House* concert.

He was also the owner of the East Recording Company and an associate of Jazznote Records.

David VK3ADW, as Federal President of the WIA and Bill VK3WG, Chairman of the Radio Old Timers Association, during the service, spoke of the dedication, time and assistance their fellow amateur had given to the hobby, which concisely expressed the sentiments of all amateurs and shortwave listeners.

Brian eloquently completed his Eulogy with the following "Max made his mark on us, did he not? As a husband, father, grandfather, as a family man who loved the stuff that Christmas, birthdays and anniversaries are made of. As Committeeman, Secretary, President of the WIA and the Hardware Club. As a member of Lodge Combermere where his father was a Grand Master; as foundation and Life Member of the Master Locksmith's Association; past Melbourne Chapter Committee Member of the International Audio Engineering Society. Max's activities and involvements with people, with ideas and concepts, with words, were close to being passionate. He threw himself into causes that he cared for. He was always there when he was needed, and would drop everything to reschedule his whole week, if necessary, if there were no other way to give help to a loved one or friend. And there we come to the crux, the very centre of the forces that moved 'Kind Hearted Max.' He knew the Great Secret — that Giving is a kind of Receiving. And so he gave and gave — and so he received and was filled with the Joy of Doing, the Joy of Living. Now he has gone and all our lives are diminished.

"People like Max Hull are the Salt of the Earth and isn't that the way we feel about him, too?"

Sincere condolences to his loving wife Gwenda, daughter Diane and son-in-law Gary, son Malcolm and daughter-in-law Cheryl, his grandchildren and immediate family.

Compiled by Ken McLachlan VK3AH, from information kindly supplied by Peter Gamble VK3YRP Mrs Ann McCurdy, Mr Brian MacIntyre, Bill Rice VK3ABF and David Waddell VK3ADW.

Novice Notes

A CRYSTAL CALIBRATOR AND SIGNAL SOURCE



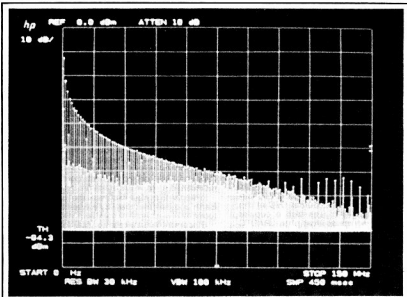
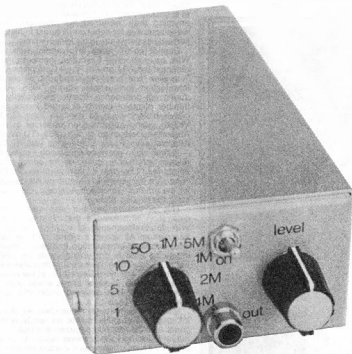
Drew Diamond VK3XU
Lot 2, Gatters Road, Wonga Park, Vic. 3115

A stand-alone calibrator has great flexibility.

The crystal calibrator has been around for a long time. More than 30 years ago, some receiver manufacturers were installing 100 kHz calibrators in their products so that the accuracy of the frequency dial could be easily and regularly checked. Today most transceivers have some means of checking the frequency display accuracy. However, a stand-alone calibrator has greater flexibility. Let me list some of the perceived uses:

- As a device to check that all transmissions are confined to authorised bands, so satisfying DOC licence requirements.
- To check existing receiver frequency dial accuracy and for calibrating new receivers.
- A weak adjustable signal source for receiver sensitivity checks.
- An accurate marked generator to check time-base calibration of oscilloscopes.
- Signal tracer/audio signal generator.

There are probably many more uses that I have not been able to think of. This calibrator can be made cheaply with a readily available clock crystal and fast ICs. Intervals or increments of 4000, 2000, 1000, 500, 100, 50, 10, 5 and 1 kHz are supplied. As the output is a harmonically rich squarewave, pips or marks at least into the VHF region are produced. The photograph shows a spectrum analyser (amplitude versus frequency) display of 500 kHz harmonics with good strength to 150 MHz. For example, if we wanted to check the frequency accuracy of a two-metre receiver at 146 MHz, we should find the 73rd harmonic of 2 MHz (2000 kHz), or the 146th harmonic of 1 MHz,



nically centred on that channel. The 36th harmonic of 4 MHz would provide a mark at 144 MHz. Similarly, the bottom edge of the 80-metre band would be accurately confirmed by looking for the seventh harmonic of 500 kHz at 3500 kHz, and so on. More about this later.

CIRCUIT

For speed and harmonic richness, plus low battery drain, low-power Schottky TTL devices are used throughout (CMOS would have lower battery drain, but does not have the speed required to produce lots of harmonics). The circuit is all pretty standard — straight from applications notes. The 4 MHz clock crystal is maintained in oscillation by two series connected 74LS04 inverters. The 4 MHz signal is made available as an output, and also applied to U2, a 74LS73 wired to divide by two and then two again, yielding 2 MHz and 1 MHz output. This 1 MHz signal is sequentially divided by two and five (U3), two and five (U4), two and five (U5), giving us 500, 100, 10, 5 and 1 kHz outputs. These divide by two and five functions are provided by 74LS90 ICs. A diode is connected in series with the six volt battery to give reverse battery protection and to drop the supply voltage to nearer the recommended five volts required for TTL 74LS series devices.

CONSTRUCTION

A single-sided PWB accommodates all components except C8 and R3. Be careful to install

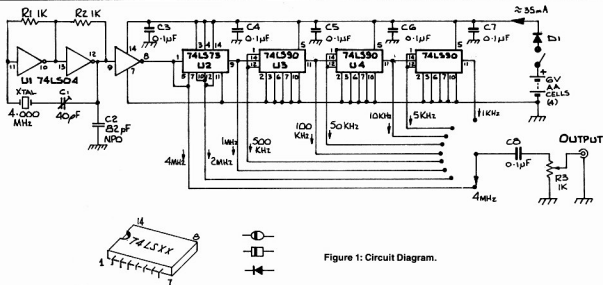
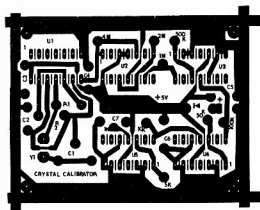


Figure 1: Circuit Diagram.



PWB Artwork.

all ICs correctly. Note that U4 and U5 are orientated differently from U1-U3. A fine pointed soldering iron will be required. When soldering is complete, check that no solder bridges exist.

If smaller signal receiver work is planned, the calibrator must be housed in a totally metal box to keep stray fields from reaching the receiver input. Mine is housed in an "off-the-shelf" box measuring 70 x 40 x 125 mm (WHD). There are nine intervals to be switched to the output connector. Unfortunately, I could not buy a nine-position switch, so a 12-position switch was used, leaving three positions spare. The choice of connector type must be left to the individual. I prefer BNC connectors for test equipment, but they are rather expensive, and an ordinary RCA type would be just as good in this application.

The front panel should be lettered in some manner. One of the easiest and most effective methods for the amateur is to use Letraset® or

similar press-on letters. Sheets of these can be obtained from stationers, graphic suppliers and some newsagents. When the panel is lettered, a coat of clear lacquer spray will prevent them from being rubbed off in use. If you have not used this method before, I suggest that you practice on a scrap of material before attempting the final product. Remember to burnish (rub down) each letter by overlaying the special semi-transparent paper provided and applying moderate pressure with your swizzle stick.

CALIBRATING YOUR CALIBRATOR

The precise oscillating frequency of the crystal must be adjusted to as near 4,000 MHz as is possible with the techniques available to you. There are two perceived methods that we may employ. If you have access to an accurate frequency counter; connect the 4 MHz calibrator output to the input of the counter and adjust C1 so that 4000.000 kHz is indicated. Let the calibrator run for a few minutes to check

the stability of the crystal. The counter time-base period should be set to the longest available (usually 10s).

The second, and more popular method makes use of a receiver which can be tuned to one of the time and frequency standard signals. VNC, Lyndhurst, Victoria (future operation in doubt at time of writing) transmits on 4.5, 7.5 and 12 MHz. WWW/WWVH, USA/Hawaii transmits on 2.5, 5, 10, 15, 20 and 25 MHz. In addition, there are several SW broadcast signals available. The BBC usually puts in a good signal each afternoon on 7.150 MHz. Connect about one metre of wire (eg a clip lead), to the output of the calibrator to act as a small radiator and turn the calibrator output to maximum. If, for example, your receiver is tuned to WWV on 10 MHz AM (good signal most afternoons and evenings), you should hear an audible beat note caused by the difference in frequency between that of the calibrator and the standard signal. Adjustment of C1 should vary the frequency of the beat note. Set C1 for 'zero beat' is where the note is so low in frequency that a slow "whoosh-whoosh" is all that can be heard. A more accurate setting can usually be obtained by switching the receiver BFO on, and adjusting C1 so that no warble or burble is heard. The crystal frequency will now be within a few Hertz of that of the standard signal.

In use, the calibrator must be set to deliver an output which puts a harmonic upon the frequency of the standard. For example, 10 MHz WWV would require the calibrator to be set 2 MHz, 1 MHz or 0.5 MHz, etc, whereas for the BBC on 7.150 MHz, 50 kHz would be required from the calibrator. The higher the frequency of the known standard; the better the result.

Whenever any receiver work is performed, it may or may not be necessary to directly connect the calibrator to the receiver input. It will generally be found at HF that sufficient signal strength can be obtained with the set-up previously mentioned for receiving the standard signal.

APPLICATIONS

The most traditional application has already been mentioned, that of receiver frequency

calibration. The dial of a new or repaired receiver can be readily calibrated by first using large increments to find 1 MHz points. For example, a receiver which is expected to cover 3 to 4 MHz can first be calibrated for the 4 MHz mark by applying just 4 MHz. Then the 3 MHz mark could be found by applying 1 MHz (third harmonic). Next, apply 500 kHz pips and note these, then 100 kHz pips and so on, down to the smallest increments required.

Whenever any work is performed where great frequency precision is required, the calibrator should first be checked for accuracy as previously described.

Some idea of receiver sensitivity can be obtained if the calibrator is housed in an RF-tight box. It should be possible to reduce the calibrator signal amplitude to equivalent sub-microvolt level with R3. Experience and use will soon tell the user how healthy the receiver sensitivity is by applying appropriate signals from the calibrator (eg 500 kHz pips).

There are a number of oscilloscopes on the market now for around \$200 — but they generally do not have an accurately calibrated horizontal time-base in terms of time/division, which is the norm for the more expensive 'scopes. The calibrator can be simply applied to the 'scope vertical input and the time-base adjusted so that more accurate time domain measurements can be made upon the horizontal axis.

Similarly, very accurate audio frequency measurements can be performed with Lissajous figures — by applying an adjustable but not accurately known frequency to the vertical input of an oscilloscope, and a known frequency from the calibrator to the horizontal input. Most radio handbooks have details of how to apply this technique.

By the nature of its output, the calibrator may also be used as a broadband signal source or signal tracer for receiver work, using the 1 kHz output, and applying this to the various stages of a receiver, from antenna input right through to the audio end and observing the results. A small capacitor (say 100 pF) should be connected in series with the calibrator output to prevent a DC path when working on some circuitry. It is suggested that a suitable probe could be made up for this application.

If you plan to make many accurate long-term frequency measurements and want a really first-rate local frequency standard, the crystal should be 'ovenised'. Details of how to do this were provided recently in references 1, 4 and 5 below.

PROBLEMS

Do not be tempted to mix IC types, but stick to the LS series specified. Please, if you cannot get your calibrator to work satisfactorily, write to me about it and I shall extend any reasonable amount of help necessary. (An SASE would be appreciated).

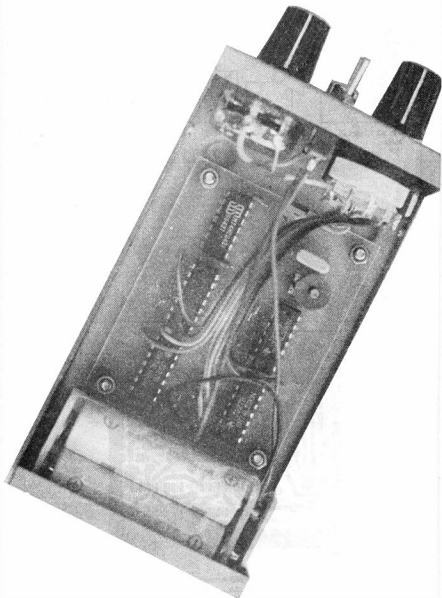
PARTS

All the components for this project are common and readily obtainable. If you wish to obtain all your parts from one source, the following supplier can oblige. A kit of parts can be obtained for \$30, including postage, but excluding the case.

Ian J Truscott's Electronic World
30 Lacey Street
Croydon, Vic. 3136

REFERENCES AND FURTHER READING

- 1 POGSON, A Simple Temperature Controlled Crystal Oven, *Electronics Australia*, April 1987.
- 2 RULE, Digital Calibrator, *Practical Wireless*, October 1983.
- 3 MIMS, Electronic Engineers Notebook II, Tandy Publication.
- 4 KIMBERLEY, VK2PY, 10 MHz Frequency Reference (Part 1), *Amateur Radio*, September 1986.



Internal View.

5 KIMBERLEY, VK2PY, 10 MHz Frequency Reference (Part 2), *Amateur Radio*, October 1986.
6 Fairchild TTL Data Book.

PARTS LIST

Capacitors
40 pF max Philips Trimmer
82 pF NPO Ceramic
0.1 uF Monolithic
0.1 uF Disc Ceramic

Resistors
1 kohm, 1/4 watt or 1/2 watt, 5%
1 kohm, log or lin variable

Semiconductors
74LS04 IC

C1
C2
C3, C4, C5,
C6, C7
C8

R1, R2
R3

U1

74LS73 IC
74LS90 IC
Diode, 1A, greater than 100 volt
Crystal

4.0 MHz Parallel Mode, 30 pF
M-TRON


Miscellaneous
Metal box, not smaller than 70 x 40 x 125 mm (WHD), 9 or 12 position rotary switch, RCA female connector, 10 colours of wire (rainbow ribbon), battery holder for four size AA cells, battery connector, on/off switch, two knobs with pointer, Letraset or similar, solder, screws, nuts, spacers, rubber feet.

U2
U3, U4, U5
D1

Y1

Coaxial Cable Specials

Low Loss VHF/UHF Cables


Description	Trade & U.L. Type Number	AWG (Stranding) Dia. in/in. Nom. D.C.R.	Insulation & Nominal Core O.D.		No. of Shields & Material Nom. D.C.R.	Nom. Imp. Ω	Nom. Vel. of Prop.	Nominal Capacitance		Nominal Attenuation												
			Inch	mm				pF/ft.	pF/m	MHz	dB/100 ft.	dB/100 m										
	9913 80C	9/16 (Solid) 108 bare copper 9011 M 2.9511 km	.285	7.24	Duobond III® + 88% tinned copper braid 1.8 (1) M 6.0 (1) km 100% shield coverage	50	84%	24	76.7	50	0.9	3.0										
										100	1.4	4.6										
										200	1.8	5.9										
										400	2.6	8.5										
										700	3.6	11.8										
										Black PVC jacket.										900	4.2	13.8
																				1000	4.5	14.8
																				4000	11.0	36.1

BELDEN 9913 low-loss VHF/UHF coaxial cable is designed to fill the gap between RG-8 to RG-213 coaxial cables and half-inch semi-rigid coaxial cable. Although it has the same O.D. as RG8/U coaxial, it has substantially lower loss, therefore providing a low-cost alternative to hard-line coaxial cable. Your special price from ACME Electronics is only \$4.84 per metre.

BELDEN Broadcast Cable RG-213/U MIL-C-17D is only \$5.23 per metre, or BELDEN 22385 YR Commercial Version RG213, the same specification as 8267, for only \$2.14 per metre. *Prices do not include Sales Tax.

For more information about the above, or any other BELDEN cable, simply contact our resident amateur radio operator, Colin Middleton (VK3LO) or our sales department.

Coaxial Cables

Description	Trade & U.L. Type Number	AWG (Stranding) Dia. in./in. Nom. D.C.R.	Insulation & Nominal Core O.D.		No. of Shields & Material Nom. D.C.R.	Nom. Imp. Ω	Nom. Vel. of Prop.	Nominal Capacitance		Nominal Attenuation												
			Inch	mm				pF/ft.	pF/m	MHz	dB/100 ft.	dB/100 m										
	8267 1354 60C	13 (7x21) .089 bare copper 1.8711 M 6.110/km	.285	7.24	Poly-ethylene Bare copper 1.211 M 3.901/km 97% shield coverage	50	66%	30.8	101.0	50	1.6	5.2										
										100	2.2	7.2										
										200	3.2	10.5										
										400	4.7	15.4										
										700	6.9	22.6										
										Black non-contaminating PVC jacket.										900	8.0	26.3
																				1000	8.9	29.2
																				4000	21.5	70.5

**RG-213-U
ML-G-3TD**

RG-213/U
MIL-C-17D



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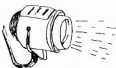
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Spotlight on SWLing

Robin Harwood VK7RH
52 Connaught Crescent, West
Launceston, Tas. 7250

Well, Spring has certainly arrived and HF conditions have been improving gradually. I have been following the daily prognostic reports and forecasts from IPS and Space Services, in Sydney, via Radio Australia. The sunspot count has been steadily increasing, although the number of geomagnetic disturbances have also increased. This service is aired from Monday to Saturday at 0425, 0825, 1225, 1625, and 2025 UTC, on the usual RA outlets. In addition, I also occasionally utilise the WWV propagational forecasts heard at 18 minutes past the hour. This has an added bonus of having an update of the K index every few hours.

October is also the month for the annual VK/ZL contest, plus the Jamboree on the Air (JOTA). At the end of the month, the world-wide "CQ" radio will be held, so there will be plenty of activity within the DX allocations, particularly in the VK/ZL and CQ contests. Both have sections, I think, for SWL participation. I am sure that details on these can be found in the Contest Column. (The VK/ZL rules were on page 45, August AR). JOTA is not a contest, but an occasion where "CQ" radio brings Scouts, Guides, Cubs and Brownies together. I have been involved over the past 14 years, but last year I did not participate as I was on my honeymoon. I expect that I shall again be

involved with the Launceston Sea Scouts, either portable or from the home station.

A new broadcasting period commenced on September 27 and will last until November 1. This period is timed with Europe and the USSR returning to normal time from Summer Time. I suspect that we shall begin Summer Time on the third Sunday of this month. North America concludes Summer Time on October 31.

I have almost given up MW DXing ever since all ABC networks began continuous operation. Also, 7LA increased its power to 5 kW and there are a few spurs on my receiver, so I think I will refrain from serious DXing until I am able to go to Weymouth, about 40 kilometres north of here, away from RF over-loading. I am seriously considering having a MW loop constructed to null out some of the Australians. Incidentally, you have probably noticed that ABC Radio National is now replaying Radio Australia from midnight to dawn. Some of the regionals may also opt to relay them as well!

The Persian Gulf region continues to produce tension and it is very easy for us to keep abreast with what is happening via shortwave. United Arab Emirates Radio, in Dubai, has probably the best coverage of news from this trouble-spot and it is well heard on either 17.775, 15.435 or 21.700

MHz, at 0530 UTC, in English. The Voice of Islam, Iran, from Teheran can be sometimes heard in English at 1115 UTC, although their signal is extremely strong during the daylight hours here on 15.084 MHz. They broadcast in Persian, Arabic (which is heavily jammed by Iraq), Spanish and French.

Other Middle Eastern stations can be easily heard, but most broadcast in Arabic. Kuwait is on 15.495 and 15.345 MHz, from 0300 UTC, and Baghdad is on 15.100 MHz. Damascus is on 15.020 MHz around 0800 UTC in Arabic. Saudi Arabia can be heard at 0400 UTC when they are broadcasting in Turkish on 15.060 MHz and, I believe, they broadcast in Indonesian later in the day on that channel.

I occasionally wish I could understand Arabic and know what is being said, but I am reliably informed that it is very difficult, if not impossible to master, studying at home. I did learn French and German when I was at Scotch College in Launceston, but that was 25 years ago, and I am rusty now! I surprise myself sometimes when I speak a little fractured arabe to French or German tourists visiting Tasmania, but I have certainly forgotten much. Maybe I should consider doing a refresher course next year?

Good listening and 73 de VK7RH



Pounding Brass

Gilbert Griffith VK3CQ
7 Church Street, Bright, Vic. 3741

It is my sad duty to report the death of Clive Burns VK3CQL, who became a Silent Key on July 23, 1987.

It has been suggested by Bill VK3NRV, that we take up a collection for a perpetual trophy to remember Clive by, and Bill has pledged \$30 himself.

I would like to recommend a trophy for the Novice Contest CW Section winner each year, mainly because of Clive's great interest in helping novices and budding Morse enthusiasts with his excellent sending.

Many people have remarked on the readability of his signals and the great help he was in teaching good operating techniques. My own interest in Morse was sparked by Clive and I chatted with him daily for my first year or so on air. In fact, we QSOed so often that I did not log most calls — he was always "there". So, I, especially, will miss his familiar fist.

Should you wish to send a donation I will be pleased to arrange with the Victorian Division for a suitable trophy.

I have been in touch with the *Amateur Radio Telegrafische High Speed Club*, eV, in Germany,

through Max DL6AN, and have received a copy of a letter he had published in their newsletter, I-IV 1986. The letter is rather long and so will not be reprinted here. Essentially it describes the problems being faced by a number of High Speed Code Clubs in West Germany. Some of their members feel that their interests are not getting the support they would like from the DARC. Obviously this is not an argument in which we should participate, but if any reader would like more information, a copy of DL6AN's letter can be obtained from the Federal Office, PO Box 300, Caulfield South, Vic. 3162, on request, accompanied by a SASE.

From Max's letter, it seems we may be fortunate in having our WIA, if we decide to use it as 'Morse Operators' should.

I wonder if the following operators could contact me with any information they may have about the HSCoV? The call signs are VK4SS, VK4ANY, VK5LQ and VK5BY.

Max DL6AN, has pointed out to me that many people, including the above, are interested in continuing the tradition of 'Knights of the Key'.

73 Gil VK3CQ

Intruder Watch



Bill Martin VK2COP
FEDERAL INTRUDER WATCH CO-ORDINATOR
33 Somerville Road, Hornsby Heights, NSW. 2077

The authorities in Indonesia have had a recent clamp down on illegal transmissions. Between 400 and 500 sets of equipment have been confiscated, according to Indonesian sources. Most of the problem was on the two-metre band. A pity some other administrations would not follow their example.

Reports on intruders continue to be fairly static, and we look for ward to more reports when conditions improve. Of course, this means that the incidence of intruders will also rise.

Reports were received for the month of June 1987, from:

VK2s DEJ, PLL, QL, Arthur Bradford; VK4s AKX, BG, BHJ, BTW, DA, KHC, VK5L7, VK6JQ, VK7RH and VK8s HA and JF

There were 92 intruders reported using the broadcast (A3E) mode; 145 using CW (A1A); 79 using RTTY (F1B) and 39 using other modes. Of these, 37 intruder stations supplied us with their call signs. More reports have been coming in regarding fishing boats using the 80 metre band, which is not necessarily illegal — it depends on where they are and, who knows where they are?

I am not too happy personally at the moment, as my computerword processor has finally 'crashed'. I picked it up today from the manufacturers after parting with a \$100 repair fee, and the miserable thing is just as dead as when I took it to be repaired! Guess where I am going in the morning? So, the column must be a little shorter than usual this month, as I am struggling with the old-fashioned typewriter system. (How we get spoiled).

Please keep the reports coming, and thanks to those who give continuing support to the Intruder Watch.

73 and good DX.

COMPUTER PROGRAMS

Due to the length and quality of some computer program printouts, it is frequently impossible to reproduce them effectively for others to copy. Members interested in particular programs are advised to contact the author for an original copy of the relevant program. (Please include an SASE).

Know your Second-hand Equipment

Ron Fisher VK30M

3 Fairview Avenue, Glen Waverley, Vic. 3150

Again this month we will look at a variety of equipment which will include a few transceivers that are not so well-known. They do, however, appear on the secondhand market from time to time and could represent an economical introduction to HF operation.

GALAXY TRANSCEIVERS

Galaxy equipment was produced in the United States by World Radio of Iowa. There were five different models produced over the period 1963 to about 1973. In the latter years, Galaxy was taken over by Hy-Gain Electronics, who, of course, were well-known for their amateur antennas.

The first two models were tribanders, which covered the 80, 40 and 20 metre bands. Actually, at this time, most American manufacturers produced tribanders which suited the poor conditions being experienced due to the sunspot minima. With SSB just starting to become really popular, it was also an economically sound way to get into the new mode.

GALAXY 300

Released in early 1963, the 300 was an SSB only transceiver for the 80, 40 and 20 metre bands. However, coverage was limited to the American phone bands and so some modification was required for use in this country. Circuitry was all tubes with a pair of 6HF5s in the final running at about 300 watts PEP input. Very few 300s found their way to Australia, but if you do find one, beware, as some of the tubes used were compactrons with three or more functions in the one tube (early ICs) and would be next to impossible to replace. The original price is not known, but, secondhand value with AC power supply would be about \$100.

capacitors. Price new in 1964, with AC power supply, was \$520. Secondhand value today would be about \$150.

GALAXY V

Within a few months of the Galaxy 111 arriving on the market, the five-band version was released. Apart from the addition of the 15 and 10 metre bands, everything remained the same — including the problems. With transceivers of this age many other age-related problems can often be found. Perhaps one of the most persistent problem is VFO instability. While the Galaxy had quite good stability when new, after 20 years use, a cure to instability is often difficult to locate. Another age related problem with the Galaxy and other transceivers, is the dial drive mechanism. Easy to obtain a few years ago, the English Jackson drives are now difficult to find. The new price of the Galaxy V, with AC power supply, was \$600 in 1965. Secondhand value today would be about \$200.



GALAXY GT-550

While the Galaxy V went through a couple of facelifts during its life-span, the GT-550 was a major change. The dial scale was moved from the side to the top of the tuning knob. The cabinet styling was also modernised. More transistors were used with the VFO and heterodyne oscillator now using solid-state devices.

Power was now up to 550 watts PEP input with a claimed 300 watts PEP output. I am somewhat sceptical about this claim, but these are the figures specified! Dial calibration on all Galaxy models was in 5 kHz divisions. Options on all models included: External VFO, VOX unit, crystal calibrator unit, AC and 12 volt DC power supplies.

New price of the GT-550, with AC power supply in 1968 was \$630. Secondhand value today would be about \$225.



YAESU FT-201 HF TRANSCEIVER

It is now back to Yaesu and one of their lesser known HF transceivers. Rumour has it that the FT-201 was developed as a replacement for the FT-200. Another says that it was a low-priced alternative to the FT-101 series. Whatever, the 201

did not stay on the market for very long despite some excellent and interesting features.

The unit was fully self-contained with built-in AC and 12 volt DC power supply. It covered amateur bands from 80 to 10 metres, with a 15 MHz receive facility for WWV. The circuit was all solid-state except for the transmit driver and final stages which used a 12BY7 and two 6J56s.

Construction was on a more economical plan than the FT-101, and there were no plug-in circuit boards used. However, it did have a much better dial with the kilohertz scale set behind the panel which was rear illuminated. The S-meter was also larger than the 101 and the rear illumination was much improved.

The transceiver was supplied with a standard SSB filter, but both a CW and AM filter were available as optional extras. Transmitter power output was the same as the 101, about 125 watts. Receiver performance was generally reasonable, but the AGC action left a little to be desired, as did the strong-signal handling.

However, if you can find one on the secondhand market in good condition, you should find it a useful standby rig. Price new was \$498 in 1974. Today, secondhand value would be about \$300.

Thought for the Month

Solutions can be achieved when a minority with all the answers becomes the majority.

TEST EQUIPMENT

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GALAXY 111

This was the first Galaxy to be imported into Australia in reasonable quantities. They were sold here by Sideband Electronics of Springwood, NSW. Whereas the 300 was rather large, the 111 was, for the time, very compact. Although coverage was still 80, 40 and 20 metres, a full 500 kHz was now provided and CW operation was also included. The circuit was very similar to the 300, but the compactron tubes were replaced with more conventional types. A single conversion set-up was used with a 9 MHz IF and a 5 to 5.5 MHz VFO was mixed to give output on 80 and 20 metres and was heterodyned with a crystal mixer for 40 metres. 6HF5s were used in the final to give about 150 watts output. Overall performance was, for the time, rather better than most contemporary rigs with excellent stability and selectivity. At the time many were used mobile with very good results. Problems to look for include the crystal filter (this is very prone to trouble). This often shows as low transmitter output, poor audio quality on both transmit and receive, and very different quality when changing from upper to lower sideband.

The receiver audio and AGC circuits were transistorised and, after many years, the electrolytic capacitors are prone to failure. If you acquire a Galaxy it is often easier to replace all of these



VHF UHF

— an expanding world

Eric Jamieson VK5LP
8 West Terrace, Menangle, SA. 5264

All times are Universal Co-ordinated Time and indicated as UTC

AMATEUR BANDS BEACONS

FREQUENCY	CALL SIGN	LOCATION
50.010	JZ2IGY	Mie (Ning Nagoya)
50.075	VS8XJ	Hong Kong
50.090	KH6EQI	Honolulu
52.013	P29BPL	Lakeba Island
52.020	FK8AB	Noumea
52.100	ZK2XK	Nue
52.200	VK6VF	Darwin
52.250	ZL2VHM	Manawatu
52.310	ZL3MHF	Horby
52.320	VK6RTT	Wickham
52.325	VK2RNV	Newcastle
52.345	VK4ABP	Longreach
52.350	VK6RTU	Kalbarrie
52.370	VK7RST	Hobart
52.418	VK6MA	Mawson
52.420	VK2RSY	Sydney
52.425	VK2RGR	Gunnedah
52.435	VK3RMV	Hamilton
52.440	VK4RTL	Townsville
52.450	VK5VF	Mount Lofy
52.460	VK6RPH	Perth
52.465	VK6RTW	Albury
52.470	VK7RNT	Launceston
52.485	VK6RAS	Alice Springs
144.019	VK6RBS	Busselton
144.400	VK4RTL	Mount Mowbray
144.410	VK1RCC	Canberra
144.420	VK2RSY	Sydney
144.430	VK3RTU	Elton Waverley
144.445	VK4RTL	Townsville
144.465	VK6RTU	Albany
144.470	VK7RMC	Launceston
144.480	VK6VF	Darwin
144.485	VK6RAS	Alice Springs
144.550	VK6RSE	Mount Gambier
144.565	VK6RFB	Port Hedland
144.600	VK6RTT	Wickham
144.800	VK5VF	Mount Lofy
144.950	VK2RCW	Sydney
145.000	VK6RPH	Perth
432.057	VK6RBS	Busselton
432.160	VK6RFR	Nedlands
432.410	VK6RTT	Wickham
432.420	VK2RSY	Sydney
432.435	VK3RMV	Hamilton
432.440	VK4RBB	Brisbane
432.445	VK4RIK	Cairns
432.445	VK4RTL	Townsville
432.450	VK3RAI	MacLeod
432.535	VK3RMB	Mount Buninyong
432.540	VK4RAR	Rockhampton
1296.171	VK6RBS	Busselton
1296.420	VK2RSY	Sydney
1296.445	VK4RIK	Cairns
1296.480	VK6RFR	Nedlands
10300.000	VK6RVF	Roblesstone
10445.000	VK4RIK	Cairns

- These are beacons which are listed for the first time as the result of information received this month.
- Steve VK3OT, advises VK3RMV, on 432.435 MHz is an experimental beacon and confirms VK3RMV is not operational on 144.435 MHz.

BEACON INFORMATION REQUEST

As the result of my recent requests for updating and confirmation of operation of beacons in the Australian network, I am pleased to report information has been sent in from the Townsville Amateur Radio Club (VK4RTL), the Queensland Tropical Region VHF Association, at Cairns (VK4RIK), Steve VK3OT (VK3RMV), the NSW Division of the WIA (VK2RSY), and the VK5 Division of the WIA (VK5WI). Thank you for taking the time to write to me.

The request goes out once again for those beacon officers who have not sent in their details to please do so. Eventually, those beacons not confirmed will be shown in the list as 'status unknown' as I am determined to get the listing

accurate over the next few months. Even if your beacons are listed accurately, would you please confirm this so I can be sure. My list is not confined to Australian usage, it is listed in other publications overseas from time to time, so we might as well have it accurate.

Beacons on 10 metres are also being sent to me. They are useful indicators of a rising MUF. Those sent so far are:

28.260 VK5WI; 28.262 VK2RSY; 28.270 VK4RTL.

It appears no sorting out of frequencies has taken place yet between Townsville and Cairns. I suspect that, given terrain between the two areas and the distance, there will be very little mutual interference anyway, particularly on 70 centimetres and above. It will simply mean that VHF operators will have to learn CW to sort out the call signs if one or both are being heard.

Later on, after more information has arrived, I would like to list the various technical details of the various beacons for your interest, as most are sending in antenna types, power levels, height ASL, etc, as well as location.

It would also be an advantage if beacon co-ordinators were to send a copy of the beacon information to the FTAC Beacon Co-ordinator, so he is up-to-date too.

SIX METRE STANDINGS

My apologies to John VK4TL, for omitting his update on the beacon listing. John's original letter, in May, has been ticked as indicating the update had been made but, in the transfer to the new list, was obviously missed. On the present list, John VK4TL, should now immediately follow VK3XQ, as he now has 19 countries confirmed, the latest added being VJ8RG and VK0SJ. Sorry John, corrections will be made next February.

Incidentally, John also said the Cairns Group hope to have VK4RIK, also on six metres soon, operating from a remote site which they hope will allow former problems of having a television Channel 10 locally and fourth harmonic interference.

John also indicated that John VK4FNQ, would appear to have made the most distant contact with Sojo VK0SJ, on Macquarie Island.

NEWS FROM ALICE SPRINGS

Peter VK8ZLX, keeps me informed of happenings from Alice Springs, where he is becoming known as *The Voice from the Red Centre!* Here are some extracts from his latest letter.

Both Jeff VK6GF and Peter VK8ZLX, are considering new six metre Yagis being eight elements on 10.6 metre (35 feet) booms!

Peter is somewhat worried about the new big amplifier constructed by Mike VK8ZMA, for six metres as Mike lives north-west of Peter and mostly fires across Peter's antenna at a distance of 1.5 kilometres! Peter has his transceiver "flattened" for up to 100 kHz either side of 52.050, so expects to be concentrating more on 144 and 432 MHz this coming summer, although he will operate on six when possible.

Peter would also like to hear from anyone having an old 144 to 432 varactor tripler which he could set up as a 432 MHz beacon; he has a 144 MHz exciter for the job. Peter believes there must be quite a few of these objects lying around in cupboards and is prepared to pay a fair price for such an object or a suitable varactor diode on its own.

VK8ZLX, is still running meteor scatter scheds with Lionel VK3NM, on two metres. Some success is being had with strong pings from each end. Later information says they almost made it 29/7 2718 UTZ, when a five-second burst of VK3NM call signs were heard at S3, but rain static at Lionel's OTH prevented a contact. Latest news was an excited phone call from Peter on 13/8,

when he confirmed a two-way contact via MS had been made with Roger VK5NY, at 1946 plus 34 seconds, on two metres that morning, but VK3NM was not heard. Congratulations Peter, your efforts have paid off.

Peter advises known call areas worked on two metres from Alice Springs are:

VK8TF: VK6, VK5, VK3, VK2, VK4 and VK7; VK8TF: VK6, VK5, VK3, VK2 and VK4; VK8ZLX: VK6, VK5, VK3, VK2, VK4 and VK1; VK8TKM: VK6, VK3, VK2 and VK4.

The status of VK8ZMA and VK8JT is not known. Anyone interested in MS scheds may contact Peter at his home address of 1-35 Head Street, Alice Springs, NT. 5750, or PO Box 2953.

With the DX season rapidly coming up, Peter advises he will be using a keyer from his home address on 144 (and 432 if varactor available), the two metre source being a simple design using about five common ICs plus a PROM, similar to that used in the VK8RAS beacons.

Not content with all these happenings, Peter is looking to EME contacts and is aiming towards eight Yagis on 20 foot booms for January/February 1988. In the meantime, he could be trying four Yagis of the same design (DL8RW), to see any impact can be made on the moon or terrestrial 432 MHz! He would appreciate any advice from others already in the game on EME.

The equipment for VK8ZLX at the moment on six metres consists of either a TS670 or IC551, with both BP981 FET preamplifier to a converted FL2100 amplifier running 300 watts PEP with either an 11 element or eight element Yagi. On two metres, an IC271 with internal BP981 preamplifier to a home-brew 8974 amplifier with 350 watts PEP to a pair of 12 element NBS Yagis, with a Dressler masthead preamplifier. On 70 centimetres, an IC471A and preamplifier, single 4CX250B in a cavity to a 15 element NBS Yagi and Dressler masthead amplifier, using a SK97. All coaxial cables are Andrews LDF-50 heliax.

Peter's Es contacts for the winter include 13/7 0728 to 0740 VK2XJ, VK2ZKJ, VK2ZTJ, VK3ABO and VK3ZTS; 19/7 0245 to 0253 VK3JLK, VK3AIH and VK5NY; 27/7 0732 VK4ACG, 0734 VK4VWL; 27/7 0825 VK2OF 0837 VK3XQ and 0840 VK3ZAT. All contacts were around 52.050.

Peter says there is no news from Darwin where most stations appear to be running low power and small antennas on two metres. Best hope is Andy VK6AH.

NEWS FROM NEW CALEDONIA

Phillip Hardstaff FK1TS, (formerly VK3XGK), has sent a postcard to say he will be on New Caledonia for another year. He has just bought an FT690 MKII, and is currently active on six metres running barefoot. He plans to build a linear and log Yagi soon. He expects to be on 2K1 during 1988 and plans to operate on six metres from there. On 27/7 around 0900 UTC, he received Australian television on 51.750 and New Zealand television on 50.740 MHz, at levels to S9+. Despite frantic calling he got no response from either country. FK6EB was also calling.

The possibility exists, therefore, of contacts during late 1987 with FK1TS and then, in 1988, as 2K1, and both countries will be within Es range to Australia.

JAPANESE CONTACTS

Graham VK6RO, sends news from the Japanese QJ ham radio magazine for July 1987 showing that, during the period from the end of April through May, many contacts were being made by Japanese stations on six metres. On 23/5, an unknown VK5 was listed at 1720; on 2/5 VK4TUB and VK4ALM at 1728; these being the only VK contacts listed. Other stations worked included HL1, 2, 4, and 5; VS6, BY5, KG6DX, BY4AA, and

Common Window Times

Common Mean Wines for Saturday 17/10/1987

Head Station	Winter Time	EX Station	WB	Charleston							
VE30M	Christie Park	WB	30-23 N	01-40 W							
UT Local	EL	AZ	DEC	GPA	IM-PM Local	EL	AZ	IM-PM Local	EL	T	
1745 -0545 2.8	66.9	15.7	142.2	1056	1245	31.2	264.4	97	5	-1.8	15
1800 -0400 5.0	72.0	15.6	145.5	1090	1300	28.0	266.7	71	6	-1.8	15
1800 -0415 5.8	74.7	15.6	145.5	1090	1300	28.0	266.7	71	6	-1.8	15
1830 -0430 10.0	78.0	15.5	153.2	1081	1350	23.1	271.2	19	9	-1.8	16
1845 -0445 13.1	81.2	15.4	156.8	948	1360	23.5	272.5	9	12	-1.8	16
1900 -0500 15.8	84.7	15.3	160.1	911	1400	17.3	275.5	81	15	-1.8	16
1915 -0515 17.9	91.9	15.3	164.1	871	1415	14.4	277.6	56	15	-1.8	16
1930 -0530 20.2	98.1	15.3	166.1	807	1430	11.6	279.8	40	15	-1.8	16
1945 -0545 22.4	105.1	15.2	171.4	780	1445	8.7	281.9	10	16	-1.8	16
2000 -0600 24.5	112.0	15.2	175.0	731	1500	5.0	288.3	-120	18	-1.8	16
2015 -0615 26.4	119.1	15.1	178.7	678	1515	1.0	296.1	-152	20	-1.8	16
2030 -0630 28.3	126.3	15.1	182.3	623	1530	0.3	298.2	-175	21	-1.8	16

Common Mean Wines for Sunday 18/10/1987

HEAD STATION		WINTER TIME		EX STATION		WB		Charleston			
VE2	Sydney	WB	30-23 N	01-40 W							
35 59 S	154 13 E										
UT	Local	EL	AZ	DEC	GPA	IM-PM Local	EL	AZ	IM-PM Local	EL	T
1730 -0330	1.1	76.0	15.5	128.4	1195	1230	30.0	248.9	248	3	1.7
1745 -0345	1.4	73.9	15.4	132.1	1182	1245	30.6	251.9	219	5	1.7
1800 -0350	1.8	77.8	15.4	135.7	1164	1260	29.4	254.7	189	5	1.7
1815 -0405	5.9	82.9	15.3	139.3	1142	1315	28.0	257.4	159	1	1.7
1830 -0430	12.8	87.7	15.3	143.0	1116	1330	27.0	259.4	130	2	1.7
1845 -0445	15.1	94.7	15.2	146.6	1088	1345	25.9	261.5	101	3	1.7
1900 -0500	18.4	102.7	15.1	150.3	1050	1400	22.0	264.7	68	4	1.7
1915 -0515	20.7	109.7	15.0	153.9	1012	1415	19.1	266.8	39	5	1.7
1930 -0530	23.1	116.7	15.0	157.5	975	1430	16.0	268.9	10	7	1.7
1945 -0545	25.4	124.7	15.0	161.2	922	1445	13.1	271.5	-22	9	1.7
2000 -0600	28.0	131.8	14.9	164.9	872	1500	8.0	274.6	-50	11	1.7
2015 -0615	31.1	138.8	14.8	168.5	818	1515	7.2	275.8	-81	13	1.7
2030 -0630	33.4	145.9	14.7	172.2	763	1530	4.8	278.0	-110	15	1.7
2045 -0645	35.4	153.1	14.7	175.9	708	1545	1.9	280.2	-140	17	1.7

Common Mean Wines for Sunday 18/10/1987

Head Station	Winter Time	EX Station	WB	Charleston							
VE30M	Christie Park	WB	30-23 N	01-40 W							
UT Local	EL	AZ	DEC	GPA	IM-PM Local	EL	AZ	IM-PM Local	EL	T	
1800 -0400 1.3	75.1	10.4	137.1	1130	1300	33.5	254.7	176	-1	1.7	17
1815 -0415 1.6	78.0	10.3	139.3	1124	1315	33.0	256.8	147	1	1.7	17
1830 -0430 6.9	70.0	10.3	143.0	1105	1330	32.1	259.9	124	2	1.7	17
1845 -0445 9.6	76.8	10.2	146.6	1081	1345	29.5	262.4	97	4	1.7	17
1900 -0500 15.8	84.7	10.1	150.3	1040	1400	25.0	265.4	64	5	1.7	17
1915 -0515 15.0	83.3	10.1	153.9	1025	1415	23.9	267.0	44	7	1.7	17
1930 -0530 17.6	90.6	10.0	157.6	990	1430	22.0	268.9	15	10	1.7	17
1945 -0545 20.1	97.9	9.9	161.2	950	1445	19.3	271.5	10	11	1.7	17
2000 -0600 22.6	105.1	9.8	164.9	910	1500	15.0	273.6	0	13	1.7	17
2015 -0615 25.0	112.0	9.7	168.5	865	1515	11.0	275.8	-15	14	1.7	17
2030 -0630 27.3	119.1	9.6	172.2	816	1530	8.8	278.0	-43	15	1.7	17
2045 -0645 29.4	126.3	9.5	175.9	765	1545	6.9	280.2	-72	16	1.7	17

Common Mean Wines for Saturday 17/10/1987

COMMON HENRY WINDEN for Saturday 27-10-1987												
PENE STATION			Winter Time			EX STATION						
VE	UT	EL	Sydney	WB	Charleston	WB	Charleston	WB	Charleston	WB	Charleston	
UT 20.5	EL	AZ	DEC	GPA	IM-PM Local	EL	AZ	IM-PM Local	EL	T		
UT Local	EL	AZ	DEC	GPA	IM-PM Local	EL	AZ	IM-PM Local	EL	T		
1800 -0400	1.3	75.1	10.4	137.1	1130	1300	33.5	254.7	176	-1	1.7	
1815 -0415	1.6	78.0	10.3	139.3	1124	1315	33.0	256.8	147	1	1.7	
1830 -0430	6.9	70.0	10.3	143.0	1105	1330	32.1	259.9	124	2	1.7	
1845 -0445	9.6	76.8	10.2	146.6	1081	1345	29.5	262.4	97	4	1.7	
1900 -0500	15.8	84.7	10.1	150.3	1040	1400	25.0	265.4	64	5	1.7	
1915 -0515	15.0	83.3	10.1	153.9	1025	1415	23.9	267.0	44	7	1.7	
1930 -0530	17.6	90.6	10.0	157.6	990	1430	22.0	268.9	15	10	1.7	
1945 -0545	20.1	97.9	9.9	161.2	950	1445	19.3	271.5	10	11	1.7	
2000 -0600	22.6	105.1	9.8	164.9	910	1500	15.0	273.6	0	13	1.7	
2015 -0615	25.0	112.0	9.7	168.5	865	1515	11.0	275.8	-15	14	1.7	
2030 -0630	27.3	119.1	9.6	172.2	816	1530	8.8	278.0	-43	15	1.7	
2045 -0645	29.4	126.3	9.5	175.9	765	1545	6.9	280.2	-72	16	1.7	
2100 -0700	31.7	133.4	9.4	179.6	716	1600	4.9	282.4	-101	17	1.7	
2115 -0715	33.9	140.6	9.3	183.2	665	1615	3.0	284.6	-130	18	1.7	
2130 -0730	36.2	147.8	9.2	186.9	610	1630	1.1	286.9	-159	19	1.7	
2145 -0745	38.5	155.0	9.1	190.5	555	1645	0.0	289.1	-188	20	1.7	

Common Mean Wines for Saturday 17/10/1987

HEAD STATION	Winter Time			EX STATION			Charleston				
VE1	Carberra			WB	30-23 N			01-40 W			
UT Local	EL	AZ	DEC	GPA	IM-PM Local	EL	AZ	IM-PM Local	EL	T	
1715 -0315 1.4	69.0	10.8	134.9	1105	1245	37.6	259.9	191	1	1.7	17
1730 -0330 1.7	71.9	10.7	137.1	1090	1260	36.0	261.5	164	2	1.8	15
1745 -0345 6.7	64.7	15.7	142.2	1065	1245	31.8	264.4	130	4	1.8	15
1800 -0400 9.4	62.4	15.6	145.5	1030	1260	30.0	266.7	73	6	1.8	15
1815 -0415 12.0	69.7	15.5	148.8	1000	1275	28.0	269.0	44	7	1.8	15
1830 -0430 14.6	75.7	15.5	152.4	974	1330	23.1	271.2	16	9	1.8	16
1845 -0445 17.1	82.0	15.4	156.0	934	1345	22.5	272.5	9	12	1.8	16
1900 -0500 19.0	89.4	15.4	160.4	894	1400	17.3	275.5	40	12	1.8	16
1915 -0515 21.0	96.9	15.3	164.1	849	1415	14.4	277.6	24	13	1.8	16
1930 -0530 23.1	104.4	15.2	167.8	804	1430	11.6	279.8	9	15	1.8	16
1945 -0545 25.4	111.9	15.2	171.4	749	1445	8.7	281.9	-12	17	1.8	16
2000 -0600 28.0	119.1	15.2	175.0	694	1500	5.0	288.3	-150	19	1.8	16
2015 -0615 30.4	126.3	15.1	178.7	639	1515	3.1	296.1	-183	21	1.8	16
2030 -0630 32.1	133.8	15.1	182.3	577	1530	0.3	298.2	-197	23	1.8	16

Common Mean Wines for Sunday 18/10/1987

COMMON MEAN WINDS for Sunday 18/10/1981									
HEAD STATION					EX STATION				
VE1		Drilbane		WB	Charleston				
27-28 S		103-8 E			30-23 N		01-40 W		
UTC Local	EL	AZ	DEC	GPA	IM-PM Local	EL	AZ	IM-PM Local	
1715 -0315 1.4	69.0	10.8	134.9	1105	1245	37.6	259.9	191	
1730 -0330 1.7	71.9	10.7	137.1	1090	1260	36.0	261.5	164	
1745 -0345 6.7	64.7	15.7	142.2	1065	1245	31.8	264.4	130	
1800 -0400 9.4	62.4	15.6	145.5	1030	1260	30.0	266.7	73	
1815 -0415 12.0	69.7	15.5	148.8	1000	1275	28.0	269.0	44	
1830 -0430 14.6	75.7	15.5	152.4	974	1330	23.1	271.2	16	
1845 -0445 17.1	82.0	15.4	156.0	934	1345	22.5	272.5	9	
1900 -0500 19.0	89.4	15.4	160.4	894	1400	17.3	275.5	40	
1915 -0515 21.0	96.9	15.3	164.1	849	1415	14.4	277.6	24	
1930 -0530 23.1	104.4	15.2	167.8	804	1430	11.6	279.8	9	
1945 -0545 25.4	111.9	15.2	171.4	749	1445	8.7	281.9	-12	
2000 -0600 28.0	119.1	15.2	175.0	694	1500	5.0	288.3	-150	
2015 -0615 30.4	126.3	15.1	178.7	639	1515	3.1	296.1	-183	
2030 -0630 32.1	133.8	15.1	182.3	577	1530	0.3	298.2	-197	

Common Mean Wines for Sunday 18/10/1987

EX Station																					
Head Station		Winter Time		EX Station																	
VE1		Carberra		WB																	
30-23 N		149-13 W		30-23 N																	
UT Local		EL		AZ		DEC		GPA		IM-PM Local		EL		AZ		IM-PM Local		EL		T	
1715	-0315	1.4	69.0	10.8	134.9	1105	1245	37.6	259.9	191	1	1.7	17								
1730	-0330	1.7	71.9	10.7	137.1	1090	1260	36.0	261.5	164	2	1.8	15								
1745	-0345	6.7	64.7	15.7	142.2	1065	1245	31.8	264.4	130	4	1.8	15								
1800	-0400	9.4	62.4	15.6	145.5	1030	1260	30.0	266.7	73	6	1.8	15								
1815	-0415	12.0	69.7	15.5	148.8	1000	1275	28.0	269.0	44	7	1.8	15								
1830	-0430	14.6	75.7	15.5	152.4	974	1330	23.1	271.2	16	9	1.8	16								
1845	-0445	17.1	82.0	15.4	156.0	934	1345	22.5	272.5	9	12	1.8	16								
1900	-0500	19.0	89.4	15.4	160.4	894	1400	17.3	275.5	40	12	1.8	16								
1915	-0515	21.0	96.9	15.3	164.1	849	1415	14.4	277.6	24	13	1.8	16								
1930	-0530	23.1	104.4	15.2	167.8	804	1430	11.6	279.8	9	15	1.8	16								
1945	-0545	25.4	111.9	15.2	171.4	749	1445	8.7	281.9	-12	17	1.8	16								
2000	-0600	28.0	119.1	15.2	175.0	694	1														
2015	-0615	29.0	49.0	8.0	168.5	836	1551	8	275.8	-23	13	1.7	16								
2030	-0630	31.3	46.5	8.0	172.2	782	1530	8	270.8	-100	15	1.7	16								
2045	-0645	33.6	43.8	8.0	175.9	728	1509	8	265.8	-187	15	1.7	16								



Contests



Frank Beech VK7BC
FEDERAL CONTEST MANAGER
37 Nobelus Drive, Legana, Tas. 7251

CONTEST CALENDAR

OCTOBER

- 3 — 4 VK/ZL/Oceania Contest Phone Section (Rules August issue)
- 10 — 11 VK/ZL/Oceania Contest CW Section (Rules August issue)
- 11 RSGB 21/28 MHz SSB Contest (Rules September issue)
- 18 RSGB 21 MHz CW Contest (Rules September issue)
- 24 — 25 CC WW DX, Phone Section
- 28 — 30 YLRL Anniversary SSB QSO Party

NOVEMBER

- 14 Australian Ladies' Amateur Radio Association Contest (Rules this issue)
- 14 — 15 European DX Contest, RTTY Section (Rules September issue)
- 28 — 29 CC WW DX Contest, CW Section

To date, no contest information has been received by your scribe so the column for this month will be brief. By the time you are reading this issue of AR, I will hopefully be well into the final stages of processing the Remembrance Day Contest logs for 1987, and the results should be published about the same time as last year.

Although it is not a contest, the Scout Jamboree on the Air (JOTA) activity, that will be heard around the bands during the period 0001 UTC, October 17, until 2359 UTC, October 18, deserves a mention. I am sure that the Scouts, Guides, etc. who will be active from the numerous stations that will be operating for them from around the world are, at the end of the day, very much aware of the hobby it could quite likely turn into good contest operators in future years. The 15 metre band would be a good place to look for them as this would enable us to gauge the openings for the RSGB 21 MHz CW Contest, which will be running on the 18th.

ALARA CONTEST

ELIGIBILITY — All licensed amateurs throughout the world are invited to participate. The Contest is also open to SWLs.

OBJECT — The object of the contest is participation! YL works everyone, OM works YLs only. One contest (combined phone and CW) run over 24 hours.

STARTS — 0001 UTC, Saturday, November 14, 1987

ENDS — 2359 UTC, Saturday, November 14, 1987

SUGGESTED FREQUENCIES — bands to be used are: 3.5, 7, 14, 21 and 28 MHz only. The following are suggested frequencies for easier location of contacts.

3.525 to 3.590 MHz
7.100 to 7.120 MHz
14.060 to 14.235 MHz
21.100 to 21.200 MHz
21.350 to 21.370 MHz
28.100 to 28.350 MHz

OPERATION — Phone and CW operation. Each station may be counted twice on each band for credit — once on phone and once on CW. All contacts must be made in accordance with operator and station licence regulations. No net or list operation, no cross-mode contacts.

PROCEDURE — Phone: Call "CO ALARA CONTEST". CW: YLs Call "CO TEST ALARA" OM's call "CO YL".

EXCHANGES — ALARA member: RS or RST, serial number, starting at 001. ALARA member, name, YL member or OM: RS or RST, serial number starting at 001, name.

SCORING —

Phone: Five points for each ALARA member contacted. Four points for a YL non-member contacted. Three points for OM contacted.

CW: Double all points for CW contacts.

SWL: Five points for ALARA members logged. Four points for YL non-members logged.

LOGS — Single log entry (but Australian YL Novices entering for the Mrs Florence McKenzie CW Trophy should indicate their CW score separately, also). Logs must show date/time UTC, band, mode, call sign worked, report and serial number sent, report and serial number received, name of operator of station worked, and points claimed.

SAMPLE LOG

Date	Band	Mode	Call Sign	RS/T	RST	Name	Pts
Time	UTC	MHz				Sig No Sent/Rcv	
0135	28	SSB	VK3EAK	59001	59028	Jay	5
0141	21	CW	VK3RS	59902	59045	Mavis	10
0600	14	SSB	FK8FA	59025	59011	Alison	5

LOGS MUST BE SIGNED — Logs to also show full name, call sign and address of operator, and show final score (points claimed). Logs must be legible. No carbon copies. No logs will be returned. Decision of the Contest Manager will be final. Logs must be received by the Contest Manager by December 31, 1987.

CONTEST MANAGER — Mrs Marlene Perry VK2KFQ, 31 Cadell Street, Wentworth, NSW, 2648.

A TROPHY — Will be awarded for the highest aggregate score over five years (commencing 1983) of a licensed YL operator (not necessarily Australian).

MRS FLORENCE MCKENZIE CW TROPHY — This will be awarded to the Australian YL Novice operator with the highest CW score (not necessarily an ALARA member). Minimum score 50 points. The actual trophy, because of the size and weight, will not be forwarded to the winner, but a certificate bearing a photograph depicting the trophy will be sent to the winner each year.

CERTIFICATES — Will be awarded for the following:

- Top overall score
- Top score Australian YL Novice CW (Mrs Florence McKenzie Certificate)
- Top score ALARA member in each country and VK call area
- Top score YL non-member in each continent
- Top score OM in each continent
- Top score SWL in each continent
- Top score VK Novice
- Top score overseas YL Novice — CW

(Mrs Florence Violet McKenzie, 1892-1982, was the first woman in Australia to take out a transmitting licence, in 1921. She passed the Amateur Operator's Certificate of Proficiency in 1925, and obtained the call sign 2GA, later VK2FV. Mrs Mac taught Morse code to thousands of people, particularly service personnel, during the 1939-45 war years. In 1984, the Townsville Amateur Radio Club kindly donated a trophy in her memory.)

1987 CALIFORNIAN QSO PARTY

Sponsored by the Northern Californian Contest Club

The Contest is held from 1600 UTC, October 3, 1987 to 2200 UTC, October 4, 1987.

Single operator entries may operate only for 24 hours; off times must be clearly marked in your log and must be at least 15 minutes long.

Multi-operator entries may operate for the full 30 hours.

Stations may be worked once on CW and Phone on each band.

All contacts must be simplex, no MCW. All CW contacts must be made in the CW sub-band, except for 160 metres.

Californian stations that change counties are considered to be new stations and may be contacted again for point credit.

OBJECT — Stations outside of California work as many Californian stations in as many Californian Counties as possible; stations in California work anyone.

EXCHANGE — Californian stations send a QSO

number and county; stations outside California send QSO number and state/province/country.

QSO POINTS — Each complete phone contact is worth two QSO points. Each complete CW contact is worth three QSO points.

MULTIPLIERS — Stations use the number of different Californian Counties for a possible total of 58.

TOTAL SCORE — The total score is the number of QSO points multiplied by the total number of multipliers.

FREQUENCIES — 160 metres through to two metres, excluding 30 and 12 metres. CW on 1.805 and 50 kHz up from the band edge. Phone on 1.815, 3.850, 7.230, 14.250, 21.300 and 28.500 MHz. American novices will be 10 kHz up from the band edge and 28.490 MHz.

Try CW on the half hour.

Try 10 metres on the hour 1700-2000 UTC.

Try 160 metres at 0500 UTC and 80 metres at 0700 UTC.

DEADLINE FOR SCORE SUBMISSION — All logs and summary sheets must be sent to NCCC, c/o Gary Caldwell W8WVEF, 1830 Polk Street, Concord, CA, 94521, by November 15, 1987. Please include a business size SAE and postage for results. Entries of more than 200 QSOs must include duplicate sheets.

AWARDS — Certificates to the highest scoring single operator entry in each country and each station that scores 100 or more QSOs. Other special trophies will also be awarded to the top operators.



A Call to all
Holders of a

NOVICE LICENCE

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amateur radio, why not extend
your activities?

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Electro-Magnetic Compatibility Report



Hans Ruckert VK2AOU

EMC REPORTER

25 Berrille Road, Beverly Hills, NSW. 2209

I am grateful to DL1BU for permission to publish his EMC paper in Amateur Radio.

Guenther Schwarzbek* DL1BU

D-6901 Schoenau, Federal Republic of Germany

Radio Interference, caused by Harmonics of Transmitters, Disturbances to Electronic Equipment caused by Fundamental.

INFLUENCE OF RADIO TRANSMITTERS FUNDAMENTAL AND HARMONICS TO ELECTRONIC EQUIPMENT

Receivers of any type of radio services may be disturbed in their function by electromagnetic fields or currents. — Direct interference may be caused by harmonic content of the radio frequency signal (mostly fault of the transmitter).

Disturbance or general impairment of operation could be caused by the fundamental RF power of the transmitter (mostly fault of the disturbed device).

This contribution shows the way of penetration and remedies by shielding, filtering and decoupling.

INTRODUCTION

The quick growth of the number and the variety of electronic equipment and the proximity to radio frequency sources causes severe problems of mutual interference and disturbance.

Decades ago it was merely the suppression of broadband interference caused by sparks of switching devices, commutators of AC-DC motors, and, later on, broadband hum of semiconductor controlled devices (SCR, Thyristors).

Today it is a problem of one electronic device or electrical appliance causing harm to some other device, receiver, computer, television, recorders, etc. This field of Electromagnetic Compatibility expands quickly. It deals with measurement of electromagnetic fields, voltages, currents, coupling, etc, and of course, suppression by shielding, filtering and decoupling.

This contribution deals with the problems of transmitter harmonics and the influence of the fundamental frequency power to other equipment, mainly radio receivers for broadcasting purposes, sound or television. The special case of disturbance to video cassette recorders has already been dealt with previously.^{1,2}

It is advisable to keep the terms well apart: **Interference** is in most cases caused by the transmitting device by radiated or conducted transmission of harmonics or spurious frequency power. **Interference** of this type has to be suppressed at the transmitter.

Disturbance of the function of a radio receiver by the fundamental of the transmitter, operating on an entirely different frequency, is usually a fault of the receiver or any other electronic device not being able to withstand the electromagnetic field or conducted power transfer. This impairment of function due to fundamental influence must in most cases be overcome at the receiver by better shielding and filtering, and, in case of VHF/UHF receivers, by the use of highpass input filters that sufficiently suppress the transmitter fundamental. In some cases, currents on the outer conductor of coaxial cables must be reduced by using isolating transformers for the receiving frequency.

In some cases, increased attenuation between the transmitting antenna and the receiving antenna must be obtained by physically separating them.

INTERFERENCE BY TRANSMITTER HARMONICS

Harmonics of a Transmitter at the coaxial output

Every radio transmitter will generate harmonics and in some cases spurious frequencies. They are

usually reduced by the Pi-network of a tube-equipped output stage or a lowpass filter in solid-state transmitters. Pi or P-L output and matching networks represent one complete section of a lowpass filter. Harmonic reduction is in the order of 40 dB to 50 dB in output stages with transmitting tubes and Pi networks, and 50 dB to 80 dB with solid-state transmitters with two-section lowpass filtering. PTT authorities usually demand a 40 dB reduction of harmonics with shortwave transmitters and 60 dB with VHF/UHF transmitting devices. This is a general rule as far as no harmonic interference is caused in a specific case. If there is evidence of this type of radio interference, a much higher reduction of harmonics is demanded, mostly down to one nano-watt at the transmitting antenna or a tuned halfwave dipole for the harmonic frequency that causes the interference. This, as will be shown later, is not easy to achieve due to leakage of the equipment for VHF/UHF harmonics.

The primary solution will be the introduction of a harmonic filter at the transmitter output. These lowpass filters are readily available and are equipped with the usual coaxial connectors. As the main aim is suppression of higher harmonics in the VHF/UHF range, they must make use of feed-through capacitors and shielded boxes for the inductors. Otherwise the high attenuation of

usually 80 dB or 90 dB will fall off at higher harmonics where the parasitic inductance of the shunt-arm capacitors increases the reactance.

Figure 1 shows the attenuation curve of a 50 ohms lowpass filter of good design. The horizontal frequency scale is from zero to 1000 MHz, 100 MHz per division. The cut-off frequency (the steep slope) is at 50 MHz (left-hand side of Figure 1). Only a very small reduction of attenuation can be detected at 730 MHz with still 88 dB. If simple ceramic disc or mica capacitors are used in the shunt-arms, a multitude of resonances will occur at UHF with reduced attenuation in the expected stop band.

Figure 2 is the attenuation curve of such a "lowpass" filter. Beginning at 590 MHz the attenuation (or more accurate: the reflective rejection) is markedly reduced. Harmonics in this range might not be reduced sufficiently.

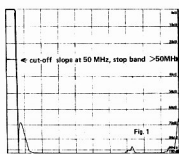


Figure 1: Attenuation of a well-designed Transmitter Lowpass Filter. Cut-off frequency 50 MHz, attenuation 90 dB to 100 dB, frequency range shown: 0-1 GHz.

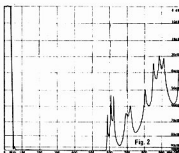


Figure 2: Attenuation of second-grade "Lowpass Filter" using ceramic disc capacitors instead of feed-through types (bad design with attenuation from 590 MHz upward). (10 dB/div).

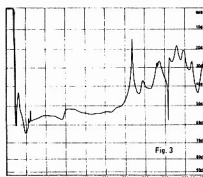


Figure 3: Bad design of a lowpass filter. Even at low frequencies only 50 dB to 55 dB of attenuation is obtained. Above 600 MHz the attenuation falls down to 14 dB at 630 MHz and 18 dB at 860 MHz. Reasons are the use of non-feed-through capacitors and lack of inductor shielding. Frequency: 0-1 GHz (100 MHz/div). Attenuation: 0-100 dB (10 dB/div). Measured in a 50 ohms system.

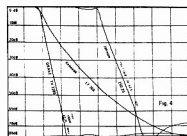


Figure 4: Different slopes in cut-off region of three lowpass filter designs. The third filter with the cut-off beginning at 50 MHz also has an attenuation peak at 63 MHz.

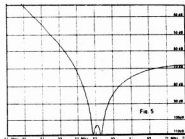


Figure 5: The third lowpass filter with the attenuation peak at 63 MHz. Maximum attenuation 110 dB by using a series resonant circuit in two of the shunt-arms (50 ohms system).

Figure 3 shows a very bad design of a lowpass filter. The maximum attenuation is only 55 dB in the VHF region and partially drops to 14 dB or 18 dB in the UHF band. In this filter, only simple disc capacitors and unshielded inductors were used.

In figure 4 the transition region between pass-band and stop-band is shown in expanded curves from 25 MHz to 75 MHz. All filters shown were designed to suppress harmonics beyond the maximum transmitting frequency of 30 MHz. Sometimes very high suppression of harmonics is required where the low VHF television frequency range around 60 MHz is still in use. The third harmonic of a 21 MHz transmitter falls to 63 MHz. With a simple lowpass filter the attenuation might not yet have reached a sufficiently low level. A series resonant circuit in one or two of the shunt-arms of the lowpass filter will provide very high attenuation near the transition frequency. If the inductor or capacitor is made variable, a sharp notch can be obtained at the critical frequency as shown in Figure 5 with 110 dB at 63 MHz and may be adjusted in the final set-up.

All curves shown so far were measured in a 50 ohms system. This comes close to most practical applications where 50 ohms coaxial cable is used together with 50 ohms antennas. The question might arise what happens in cases of mismatch. There will be no severe problems in the pass-band and stop-band. Some influence will occur in the transition region. In Figure 6, two cases of extreme mismatch are shown. The load was changed from 50 ohms to 0.5 ohm (upper curve) and 5000 ohms. Still 90 dB to 100 dB of attenuation are obtained in the filter notch with this 100:1 mismatch.

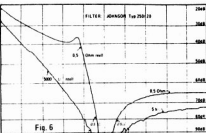


Figure 6: Shows the effect of severe resistive mismatch (SWR 100) to the antenna output of the filter that has been shown in Figure 5 with 50 ohms resistive load. The attenuation curve is changed in the transition region, but high attenuation is still achieved.

As mentioned above, some PTT authorities demand a dramatic reduction of harmonics in an actual case of harmonic interference has been reported. The question is if even higher harmonic

rejection is possible by cascading two lowpass filters of standard design. To reduce the harmonic power of a one kilowatt transmitter to 1 nW (10⁻⁹W) a total attenuation of 120 dB is required. Figure 7 shows the total attenuation of up to 130 dB of two filters in cascade. This, however, is a rather theoretical approach to the actual problem because leakage of the transmitter shielding and conducted transfer of harmonic power will radiate more than 1 nW in almost any case. This will become a matter of high-grade shielding and filtering of the transmitter modules.

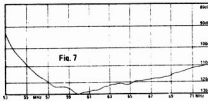


Figure 7: Indicates the total attenuation when two lowpass filters are used in cascade. A total stop-band attenuation of 130 dB or more can be obtained.

Leakage of Harmonic Power, Radiation from Transmitter and Cables

Unless extreme shielding efforts have been made and also perfect filtering of cables has been used, it is only of theoretical value to improve harmonic output filters at the coaxial connector of the transmitter on the way to the antenna. The usual 80 dB to 100 dB rejection of transmitter lowpass filters is sufficient, considering 40 dB to more than 80 dB reduction of the transmitter output network. Table 1 shows typical harmonic reductions of a one kilowatt tune-equipped power amplifier for the frequency range of 1.8 MHz to 30 MHz. The first row shows the harmonic reduction (dBc) from the maximum carrier power (or SSB single tone) for two tubes 3-500 Z, the second row for each fundamental frequency indicates the reduction with a pair of BBC T-510/1 (written in italics).

The figures marked with an asterisk (*) (90 dBc) are at the measuring limit. A very high input into the antenna (or a highpass filter) must be used, as otherwise the measuring system generates harmonics by itself due to the much higher fundamental power.

P _{out}	f ₁	Harmonics	K ₂	K ₃	K ₄	K ₅	K ₆	K ₇	K ₈	K ₉	K ₁₀	Remarks
1 kW	1.85 MHz		-45dBc	-53dBc	-74dBc	-80dBc	-80dBc*	-80dBc*	-80dBc*	-80dBc*	-80dBc*	100:1
1 kW	3.6 MHz		-45dBc	-53dBc	-70dBc	-72dBc	-80dBc*	-80dBc*	-80dBc*	-80dBc*	-80dBc*	100:1
1 kW	7.0 MHz		-51dBc	-60dBc	-70dBc	-65dBc	-80dBc*	-80dBc*	-80dBc*	-80dBc*	-80dBc*	100:1
1 kW	14 MHz		-51dBc	-60dBc	-70dBc	-65dBc	-80dBc*	-80dBc*	-80dBc*	-80dBc*	-80dBc*	100:1
1 kW	21 MHz		-54dBc	-63dBc	-73dBc	-68dBc	-80dBc*	-80dBc*	-80dBc*	-80dBc*	-80dBc*	100:1
1 kW	27 MHz		-54dBc	-63dBc	-73dBc	-68dBc	-80dBc*	-80dBc*	-80dBc*	-80dBc*	-80dBc*	100:1

Table 1: Typical Harmonic Output of tube-equipped one kilowatt power amplifier, exciter solid-state 100 watts. Compares two different types of tubes. Generally good suppression of harmonics, with the exception of certain frequencies (seventh harmonic of 14 MHz) where parasitic resonances occur.

Values up to the 10th harmonic are shown. The reduction figures without external LP filtering are quite good with a few exceptions where the parasitic resonances occur. The output capacity of the tubes comes into a series resonance with parts of the inductors, and the shunt-arm tuning and loading capacitors do not have the characteristics of feed-through capacitors. At higher harmonic (VHF/UHF) frequencies, they rather act as shunt-arm inductors, increasing their reactance to higher values. This makes additional external lowpass filtering necessary.

Transmitters do not generally use such a high degree of shielding as is used with signal generators where sub-microvolt levels have to be accurate for sensitivity measurement. They are sometimes well shielded for their transmitting frequency, but not for harmonics in the VHF/UHF range where slots between cabinet screws act as tuned slot antenna. Use of finger springs of beryllium-copper material or metal braided hose between cabinet and cover improve the UHF-shielding dramatically. The radiation of harmonics from the anode of a transmitting tube is extremely high, because at this point, no filtering for VHF/UHF harmonics has taken place.

Figure 8 shows the harmonic radiation of a 21 MHz transmitter signal (500 watts) received with a broadband antenna at one metre distance. The upper reference line represents a voltage of 107 dB (μV) or 0 dBm (one milliwatt) at the broadband antenna. Being pure near field it does not make sense to convert this into a field strength. The higher harmonic signals around 85 dB (μV) correspond to the transmitter cover removed, the lower signals around 60 dB (μV) are with the metal cover. It is quite obvious that extreme high-attenuation output lowpass filters will be of little use. The harmful radiation on broadcast and television frequencies in the VHF/UHF range do not derive from the transmitting antenna, they emanate from the transmitter cabinet.

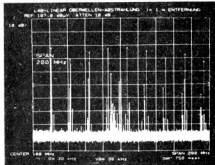


Figure 8: Harmonic Radiation from Transmitter Cabinet, fundamental frequency 21 MHz, display 0-200 MHz, reference level (upper horizontal line) 107 dB (μV) = 0 dBm at broadband antenna in one metre distance. High levels: cover removed (up to 85 dB (μV)). 10 dB/div, 20 MHz/div.

The severest leakage of harmonic power usually takes place from cables other than the RF output coaxial line. Transmitters with a separate power supply use many leads in the connecting cable that can not easily be filtered. For the heater lead high-current chokes must be used, for the plate supply high-voltage feed-through capacitors.

An alternative would be shielding of these cables, but if any improvement is expected, the shielding and the connection at both ends must be arranged according to microwave coaxial cables. Merely connecting the braid on both ends will provide a little reduction of radiation by leakage, as RF currents will flow on the outside of the shield to a certain percentage. Braid connections must be in a coaxial manner as with UHF coaxial cables. Figure 9 shows a screen spectrum display photograph of harmonic power on the connecting cable of a transmitter to the power supply. The measurement has been made with an absorbing clamp 30 MHz-1 GHz, and the uppermost line

(reference) is 100 dB (pW). The transmit frequency is 28 MHz, the full display covers 0 to 500 MHz (50 MHz/div).

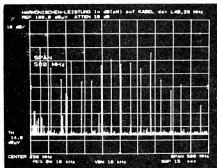


Figure 9: Harmonic Output Power on the connecting cable of a 500 watt transmitter with separate power supply. Reference line: 100 dB (pW) 10 dB/div. 50 MHz/div (total 500 MHz) (clamp measurement).

Shielding of the connecting cable will reduce this leakage radiation to some extent, but due to the coupling of this cable to the mains power cable through the power supply, filtering has to be used at the power cable to avoid further radiation by the mains power line. As the filtering of the connecting cable is difficult (high voltage, high current), the other solution of incorporating the power supply into the transmitter cabinet might be the better solution — in contrast to general opinion. In this case, only the two conductors of the mains power line cable have to be filtered. As VHF/UHF harmonics have to be considered, filters must be built with feed-through capacitors. Figure 10 shows the reason: the shunt-arm inductance of normal foil or disc capacitors with connecting wires provides a mutual impedance. Input RF current causes a voltage drop that appears at the filtered output conductor. This again means harmonic radiation. In addition to feed-through capacitors, ferrite beads help reduce UHF output.

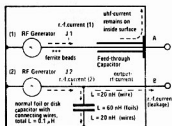


Figure 10: Upper half: the lead through the metal box leaves via a feed-through capacitor. All UHF-currents remain inside the box.

Lower half: a normal capacitor's inductance causes a division of RF currents, partly the current remains inside, another part leaks out.

Figure 11 proves a somewhat better reduction at least of the higher harmonics on the power line cable of a 500 watt, 14 MHz transmitter with the power supply built into the shielding cabinet. Unfortunately, no feed-through capacitors have been used.

DISTURBANCE TO ELECTRONIC EQUIPMENT BY EM FIELDS

There is an entirely different view on disturbance caused by receivers on other frequency bands or even to electronic entertainment or industrial equipment that has nothing to do with reception of

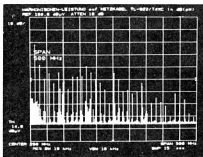


Figure 11: Harmonic Power on Mains Power Cable, 500 watt transmitter, 14 MHz. Reference line 100 dB (pW) 0-500 MHz, 10 dB/div, 500 MHz/div.

radio frequency signals. This disturbance is caused by the electromagnetic field of the fundamental transmitting frequency that must be radiated to perform the intended task. For that reason, only measures or remedies at the **disturbed equipment** will help. This should be the aim of a designer of electronic equipment to provide immunity to at least three volts per metre field strength, better 10 V/m. It is the evil of present entertainment equipment that deficiencies are discovered when already thousands, or even millions have been sold. The rules of the West German VDE-Standards (VDE 0872) were the first to demand certain immunity values for RF-fields and currents for entertainment equipment. It would be beyond the scope of this contribution to mention all measures of improvement, but of course shielding, use of antenna input isolating transformers, power line filtering with current-compensated ferrite toroidal chokes, ferrite chokes in input and output leads together with small disc capacitors will improve the situation of immunity ("Susceptibility"). Information on this matter will follow at a later time.

1. Schwarzbek, G.: Sensitivity of Television Video Recorders to RF Fields, EMC 84 Wrocław Symposium
2. Schwarzbek, G.: Videorecorder-Bestrahlung durch Funkdienstleistungen (TVI, VRI), cz-CD 11/84, S542
3. Honorary Technical Officer of the DARC, Member of DIN & VDE EMC Committee, Specialist on Field Strength Measurements and Equipment



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Adapted from Electronics News, p27 — April 1986

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WICEN News

LATROBE VALLEY WICEN ASSISTS MOTOCROSS EVENT

The Latrobe Valley WICEN unit was activated on July 3, 1987. A Motocross motorcycle event was being held in the Traralgon South area and the Latrobe Valley Ambulance Service required communications between the event and a base station which had access to a telephone.

An ambulance had been required in the morning for an injured rider, but communications to the Ambulance Service necessitated being relayed by a number of different links. WICEN was activated at 1200 hours with VK3KBG providing the home station and VK3BLE attending the Motocross event as the local station. Their services were used in the afternoon, when again an ambulance was required at the site. Activation ceased at 1700 hours, with thanks going to VK3BLE and VK3KBG, for their prompt response to the call for assistance.

—Contributed by Col Pomroy, Co-ordinator for Region 9, 10, 11 WICEN

HORSE TRIAL — MOUNT DISAPPOINTMENT

Region 13 members, led by co-ordinator Roger VK3BKR, set out on Friday, July 3, for the Mount Disappointment State Forest, 45 kilometres north of Melbourne. The Horse Trial consisted of riders taking part in one of three endurance rides along tracks of the forest. Distances being covered were 160, 80 and 50 kilometres.

The event start time was at midnight, Friday. (WICEN members were informed the horses could see well enough in the dark, but members were not convinced of their reading ability!)

WICEN was to be used to check progress of the riders, ensure they avoided particular track hazards, report any major incidents and provide an increased measure of safety to the event.

Roo VK3YML and Glenn VK3KLW, had left early on Friday to establish a base station for the exercise, and upon arrival at 2300 hours, other WICEN members were pleased to see the billy was on the boil and cups lined up.

Consultation with the event organiser, and the map, gave enough information for members to leave the comfort of the base station and find their ways to obscure check-points in the Forest. This was where self-efficiency came to the fore as it was necessary to operate alone with any home comforts coming from the equipment.

Riders wore a coloured/numbered vest denoting the section they were competing in. The tracks were marked by similar coloured disks on the trees to ensure no one got lost. As the riders passed each check-point, their colour/numbers were radioed back to base for recording purposes.

The exercise was conducted completely on two-metres, with HF mobile only needed for a short time at a check-point near the forest boundary. Messages were of a routine nature with few queries as to course directions. All riders had returned safely to base by 1800 hours on Saturday.

The event was seen as a most successful exercise, with thanks going to those who participated, including Harry VK3KBA, Alan VK3DXF and Paul VK3PW.

These type of events provide excellent training for WICEN personnel with the chance to see other amateur's equipment and operating techniques.

If you are interested in participating in these types of events, why not get in touch with your WICEN co-ordinator. You will be made to feel very welcome.

—Contributed by Paul Walton VK3PW

How's DX?

HEARD TO BE HEARD AGAIN

VK0HI, the much wanted DX call, that gave many thousands of DXers a new country is being heard through the ether again, and by the holder of its original user, Dave VK3DHF. Dave's activity will be dictated by the workload of his duties in the communication field during his stay until next year.

Dave left for Heard Island on the *Nella Dan*, early in September, for his assignment, this time in more comfort than his initial trip on the *Anaconda* where he, and all other aboard, took a share of all sailing duties, having a very memorable journey, and a ball at the same time.

Australia, at the commencement of its Bicentennial year, with propagation being tipped to commence improving, will become the focus of amateurs world-wide when they have their beams pointed in the vicinity of this vast country.

Dave has chosen a very enthusiastic QSL Manager, his father, Noel VK3EVN, a constant listener on Dave's last trip to the island. When speaking to Noel, on a visit to this QTH, he told me that one day he would become an amateur, although, at that time, he had no electronic knowledge. With Dave's coaching, and lots of encouragement from his charming wife Lorna, and the rest of the family, Noel reached that goal, firstly as a novice and then gaining the privilege of a full licence. It will be a thrill to Noel and the family to wish Dave, and the other crew members on Heard Island, Season's Greetings, from his own QTH this year. It is believed that Noel is making considerable use of the key and the microphone during his well earned retirement. Congratulations Noel.

Noel's address for QSLing is 64 Orana Drive, Watsonia, Vic, 3087, or via the bureau. For direct cards from within Australia an SASE please. Overseas stations, for an airmail return, an SAE plus two IRCs are ample funds, or via the bureau.

Log entries are essential to validate cards and it is envisaged this will be done within the amateur spectrum as time and propagation permits. If this is not possible, all cards will be checked against the original log on its return to the mainland in May next year, so please be patient.

Dave will be using moderate power on phone into dipoles throughout his stay on the island. Operation is envisaged on the DX frequencies for 80, 40, 20 and 15 metres plus 21.195 MHz to assist the novices to partake. Net operation is not

anticipated and it must be understood that Dave, during his stay, has the priorities of eating, sleeping and attending to the exacting duties as Radio Officer of the ANARE Expedition.

If you have Heard Island validated, please remember you are one of the lucky DXers in the world and please think of the innumerable amateurs from all continents that need this country to swell their DX score. The DX expeditions of 1983 did not satisfy the appetite of all DXers, including those who have been licenced since. If you have worked and confirmed this remote and rarely activated island please refrain from depriving another amateur of the privilege.

The QSL Manager would appreciate all cards to be written in UTC time and date.

Please refer to the VHF-UHF Column for the envisaged six-metre activity.



Dave VK3DHF, with his father and QSL Manager Noel VK3EVN.

As previously noted in *Amateur Radio*, the VK6 Division of the WIA, due to a sum of money graciously bequeathed by the late Hugh Spence VK6FS, have created a DX Achievers Award. Will

Dave be one of the first amateurs to obtain this prestigious award?

If Dave does, it would be quite fitting, as Hugh was on the top line of that historic VK0HI log. Hugh, with other members of the VK6 group was a driving force in getting it all together. Two members of that original group, Neil VK6NE and Don VK6DY, have greatly assisted in this present effort.

Dave to you and the crew, a safe and satisfying stay on the island is extended on behalf of all amateurs across six continents, and particularly from the DX fraternity.

—Contributed by Ken McLachlan VK3AH

VK9XI — CHRISTMAS ISLAND AMATEUR RADIO CLUB

Regrettably, due to the departure from the island of all the financial members, it has been decided to disband the radio club.

Some of the actions following the closure have been:

sharing of some of the radio equipment;
the old first original amateur station to be given to the Wireless Hill Museum, in Perth;
remaining funds, after paying freight charges, to be presented to the VK6 Division of the WIA.

Don Reed VK9DR (now VK4ADR), is to be made a life member of the WIA in recognition of his untiring efforts in encouraging many people to take an interest in amateur radio, not only on Christmas Island, but many other locations where he has worked.

The Christmas Island Amateur Radio Club members want to record their appreciation and thanks for the support and encouragement that Jim VK6RU, has provided during the years the club has been operating. Jim was Club Patron, 1963-1987.

The club members would also like to thank the WIA and, in particular, the WA Division, for their assistance. Without support of this kind from fellow amateurs and groups, the club would certainly have been very disadvantaged.

Any information or photographs that could add to the Wireless Hill Display would be appreciated in relation to amateur radio activity on Christmas Island. Such material should be sent to the VK6 Division.

—Written for, and on behalf of, VK9XI by Neil Penfold VK6NE, from material supplied by Ron Ashley VK9XA

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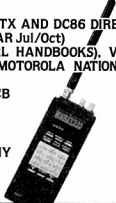
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Awards

Ken Hall VK5AKH
FEDERAL AWARDS MANAGER
St George's Rectory, Alberton, SA. 5014

AWARDS ISSUED IN JULY

WAWKCA

1546 Ray Dobson VK5DI
1547 Haruo Ishiba JE1REU
1548 Takuji Higo JA0EQK
1549 George Dimakis SV1YH
1550 Philip Marsh G4WPFZ
1551 Kovacs Laszlo HA1SB

DXCC UPDATE IN JULY

VK5WO 310/335 phone 311/339 open
VK6LK 316/365 phone
VK6RU 316/365 phone 316/365 open
VK5BO 217/218 phone 263/297 open

TASMANIAN DEVIL AWARD

The Tasmanian Division of the WIA created the Tasmanian Devil Award some years ago to stimulate interest in, and as a reward for, making contact with VK7 stations.

The basic rules are quite simple. Radio amateurs are required to furnish proof, by way of a log extract, of having worked a specified number of VK7 stations on any band, using any mode according to location and within the terms of their license, since January 1, 1978.

Below 30 MHz, the number of contacts required are:

Australia (including Tasmania)	50 contacts
Oceania and Antarctica	30 contacts
Asia and South America	20 contacts
Europe and South America	10 contacts
South Africa	7 contacts

Above 30 MHz, 20 contacts are required, with at least one station located in each of the three WIA Branch areas (STD code areas: 002, 003, 004).

Self-adhesive upgrade stickers are available when sufficient additional contacts have been made. Details of these upgrades are available from the Awards Manager, or from the Net Controller of the regular Tuesday night net, which is held on 3.590 MHz, commencing at 1000 UTC.

Shortwave listeners are eligible to qualify by adding the call sign of the 'other' station engaged in the contact.

Claims for the award should be in the form of a log extract and must show your call sign, name and address, date/time in UTC of the contact, call sign of the station contacted, signal reports sent and received, mode and band used. The claim must be signed by the applicant as being a true and accurate extract from the station log. No QSL cards or counter-signatures are required.

A fee of \$A3 should accompany the claim to cover printing and postage. The fee for upgrade stickers is \$A1. Claims should only be sent to the Awards Manager, Bob Jackson VK7NBF, 'Falmouth House', Falmouth, Tas. 7215.

—Contributed on behalf of Bob Jackson VK7NBF by Bob Richards VK7RBR

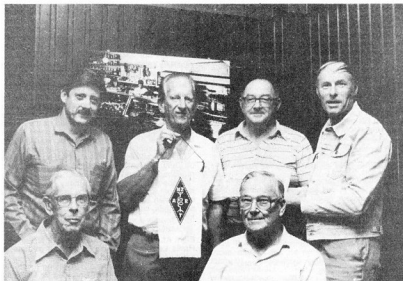
THE SOUTH EAST QUEENSLAND TELETYPE GROUP RTTY AWARD

This award is open to all transmitting and listening amateurs who gain award points in the following manner.

Australian amateurs must score five points
Overseas amateurs must score three points

(a) A transmitting amateur must work three member stations of the South East Queensland Teletype Group on RTTY (one point each). Log extracts and/or printouts are to be included with the award application, and each member station may be counted only once towards the award.

(b) Additionally, an Australian station must copy the official station of the South East Queensland Teletype Group, VK4TTY, during a news broadcast and, in the case of a transmitting amateur, participate in the call-back (two award points). A portion of the printout of the news broadcast, together with the date, time, and frequency are to accompany the request for the award.



(c) Listening amateurs should, in lieu of (a), forward log extracts and/or printouts of three contacts involving different member stations of the South East Queensland Teletype Group (one point each).

Applicants for the award should forward the above information, together with \$A1, or five IRCs, to cover postage and printing costs, to The Secretary, SEQTG, PO Box 184, Fortitude Valley, Qld. 4006.

The VK4TTY News Network transmits at 50 baud and 170 Hz shift via the groups repeater VK4RBT. 1, 147.050/147.650 MHz, with relays on 3.630 and 7.045 MHz each Monday evening at 1000 UTC.

Recently, Gary ZL1AKI, made the trip across the Tasman so he could receive his SEQTG Award in person. Gary is the first overseas award recipient. From left: Rob VK4KUG, Acting News and Broadcast Officer, Stan VK4BSD, Award Net Assistant, Gary ZL1AKI, First Overseas Award Recipient, David VK4AFA, Award Manager.

—Photograph courtesy Shaun Connolly VK4CO

The first JA to receive the award is Yoshiaki Hasegawa JA1WVK, and the first YL recipient is Josie Gleadhill VK4VG.

—Contributed by David Brownsey VK4AFA, Secretary, SEQTG



NEWPORT AMATEUR RADIO SOCIETY

Following are details of competitions which are being organised as part of the Royal National Eisteddfod of Wales, to be held at Newport from July 30 1988 to August 6, 1988.

The call sign, GB2EC, will be used by NARS as part of preparations for the Eisteddfod. Club members will hold GB2EC on a monthly rota from October 1987, until the beginning of the Eisteddfod in July — a total of 10 stations. GB2EC will be active on HF and VHF.

All contacts will receive a QSL card via the bureau. Awards can be claimed for working the call sign while it is held by different operators. Also, GW4EZW, the club call sign of NARS will qualify for one contact only.

Australian stations require three contacts on HF to claim the award.

Each QSO will have a serial number and it would be appreciated if applicants quoted this QSO number when applying for the award.

During Eisteddfod week, GB2EC will be active on all bands from the Eisteddfod sight in Newport. A distinctive QSL card will be available direct via PO Box 33, Newport, Gwent, (SAE and IRCs please) or via the bureau.

For further information contact NARS, via Box 33, Newport, Gwent.

A photographic competition, with the theme of "Amateur Radio", will also be conducted by the Newport Amateur Radio Society as part of the Eisteddfod.

The competition is open to all-comers with the best entries being displayed on the NARS amateur radio stand throughout the Eisteddfod.

Entries are invited for three categories, in two groups:

Group 1 — entrants over 18 years: Group 2 — entrants under 18 years.

Category A — Depicting amateur radio in Gwent
Category B — Depicting amateur radio in Wales
Category C — Depicting amateur radio in the world

A maximum of two entries allowed per entrant.

Three prizes will be awarded in each section. Entries must be in the form of colour or black and white prints, maximum dimensions 10 x 8 inches.

Entries must be clearly marked on the reverse side with the name and address of the entrant, call sign (if applicable), Group and Category entered, and any other relevant information.

Prints to be returned must be so marked and be accompanied by an SAE and sufficient postage. Entries will be judged by the joint committees of NARS and the Gwent Photographic Society, whose decision will be final.

Prize winners will be notified in July 1988, and prizes posted. For a list of prize winners, please enclose SAE and postage with entry.

Entries to be received by May 30, 1988 at PO Box 33, Newport, Gwent.

For further information contact NARS, via Box 33, Newport, Gwent.

—Contributed by R Keyes, GW4IED, Hon Secretary, NARS



Australian Ladies Amateur Radio Association

Joy Collis VK2EBX
PUBLICITY OFFICER, ALARA
Box 22, Yeoval, NSW 2868

ALARAs 12th birthday on July 25 was celebrated with numerous activities.

BIRTHDAY ACTIVITY DAY

Was held on Saturday, July 25, with several groups of VK and DX YLs getting on air for a "natter." We all enjoyed it so much that the general comment was "We should do this more often." Perhaps as propagation improves it may be possible to "get-together" on a regular basis. After all, communication is what it is all about! Our special Birthday Net was held on 80 metres on July 27, with five States represented, and reasonably good conditions. Several OMs "dropped in" to pass on birthday greetings. We must not forget to mention the listeners — SWLs who listen to us, some on a regular basis, and send their cards and good wishes for ALARAs future.

OTHER ACTIVITIES

Eight ALARA members were present at the VK6 Ladies' Luncheon, at the end of June; a most enjoyable occasion.

The VK6 members held a "working lunch" at the home of David VK5OV and Meg VK5AOV, on July 19. Further details next month.

The VK3 Birthday Luncheon was held on July 26, hosted being Raedie Fowler, assisted by OM Ray VK3BHL, who able filled the onerous position of "water" for the day.

The attendance was: Gwen VK3DYL, Mavis VK3KS, Austine VK3YL, Bonnie VK3PBL, Liz VK3PSG, Jean Shaw, Valda VK3DVT and Pat, Bron VK3DYF and, of course, Raedie and Ray.

A very enjoyable day was had by all, and the pleasure of "face-to-face" communication was heartily appreciated.

The weather was kind, food plentiful, and conversation likewise!

At the gathering a certificate was presented to Raedie to show her the appreciation of ALARA members for her efforts on behalf of ALARA in the early years, and her continuing interest.

(Thanks to Bron VK3DYF, for this information)

ALARAs CONTEST — November 14, 1987

After several "false starts" regarding the Alara Contest, I think we finally have it right — Saturday, November 14, is the date, your radio shack the venue, and my apologies for getting it wrong in September AR.

Last year we were pleased to have the company of some of our DX members, and we are hoping for even more this year.

Our contest is not too long (24 hours), the rules are not unduly complicated, and since its inception it has been a friendly and enjoyable contest, open to YLs and OMs alike. Why not join us?

ALARAs COMMITTEE

Further to the list of Committee members in September AR; Maria VK5BMT, has taken on the position of VK5 State Representative; and Josie VK4VG, is the VK4 State Representative.

UPGRADE OF CALL SIGN

Congratulations to Phyl, ex-VK4JFA, who is now VK4BPL. Looking forward to working the new call sign.

HOW I GOT STARTED IN AMATEUR RADIO

This is how Mimi ZSS50 began:

"I got my licence six years ago at the age of 60. My daughter Molly became an amateur when her fiancée, Gordon, a radio amateur, went to the Antarctic for 14 months. After his return and their marriage they started coaching me and, when

they went to live in Cape Town, their young university friends very kindly took over. Once I had passed the examination my worst fears were realised, I had to start on CW. Oh well, I did manage to pass the required 12 WPM and, after the regulation one year on CW, I discarded the key and have forsaken it ever since."

It has often been said that we are a little sensitive when it comes to revealing our correct ages. Maybe this is true, particularly for those who are "getting on a bit."

One YL who has no qualms about her age is JoAnne VK4LCD. JoAnne says:

Sixteen years old, quite young, so I am told, for a licensed amateur. Well, that just allows me many, many more years to enjoy OUR wonderful hobby, doesn't it? I was introduced to amateur radio in the form of JOTA. The strange mystique of chatting with unseen persons gripped me and, after JOTA '85 (my second) I took up amateur radio as a hobby.

I am to for attempt to upgrade near Christmas, but for now I have promised my loving parents (who actually find amateur radio boring!) that I'll sit for no more examinations (of amateur nature) this year, in order to concentrate on my school studies. What a rash promise that was! I aim to meet as many amateurs as possible because you are such a great bunch of people."

JoAnne is a very busy young lady. Besides completing year 12, she is studying for her Basic Electronic Certificate by correspondence, and is involved with Ranger Guides, and fund raising for (and technical aspects of) a community FM radio station in her home-town of Caboolture.

We wish you every success with all your projects, JoAnne, and hope you will continue to find amateur radio an enjoyable hobby.

JOTA

October is Jamboree on the Air (JOTA) month, and many ALARA members become involved with this very worthwhile project.

JOTA is often the starting point of a life-long involvement with amateur radio (as it was with JoAnne), so if you can assist, contact your local Scout or Guide troop and see what can be done. It can be a lot of fun, too.

WARO SILVER JUBILEE AWARD

This very beautiful award, which was very easy to obtain, now graces the shelves of a number of VKs, including at least one SWL.

Other activities are planned to celebrate the Silver Jubilee of WARO, including:

NZ WARO CENTURY AWARD
This award is not so easy to obtain, but I am sure it will be well worth the effort!

The rules are as follows:

1 Applications to contain full log details of contacts with 100 New Zealand WARO members (DX members included), dating from June 1, 1987, and to be signed by one other licensed radio amateur.

2 Contacts may be made in any mode, any band or mixed, and from any QTH, but each YL claimed must be a financial member of NZ WARO at the time of the contact and may be counted only once.

3 Contacts made via repeaters and in nets will qualify, but contacts made during NZ WARO contests will not be accepted.

4 No QSLs required. Send list of full log details and \$2 to the Custodian, Vicki Shaw ZL1OC, PO Box 2083, Whakatane, NZ.

Until next month.

73/33 Joy VK2EBX

RADIOES

BASIC ELECTRONICS*

Pure resistance let's consider,
There's no need to write a tome,
If one Volt will pass one Ampere —
Then resistance is one Ohm.

Take a pair of like resistors,
Place them first in single file,
For the total of the circuit —
Simply add them with a smile.

Parallel, we now shall place them,
Total does not neatly come,
Multiply one by the other —
Then divide this by their sum.

There are many calculations,
Some would tie your brain in knots.
But, let's end with one for power —
Ampers squared, times Ohms is Watts.

— "Hambers" (Originally printed in the Nigerian ARS Newsletter 1970s)



AMSAT Australia

Colin Hurst VK5HI

8 Arndell Road, Salisbury Park, SA. 5109

NATIONAL CO-ORDINATOR

Graham Ratcliff VK5AGR

INFORMATION NETS

AMSAT AUSTRALIA

Control: VK5AGR

Amateur Check-In: 0945 UTC Sunday

Bulletin Commences: 1000 UTC

Primary Frequency: 3.685 MHz

Secondary Frequency: 7.064 MHz

AMSAT SOUTH WEST PACIFIC

2200 UTC Saturday

14.282 MHz

Participating stations and listeners are able to obtain basic orbital data, including Keplerian Elements from the AMSAT Australia Net. This information is also included in some WIA Divisional Broadcasts.

ACKNOWLEDGMENTS

Contributions this month are from Bob VK3ZBB, VK5AGR BBS and UoSAT Bulletin Board.

UOSAT-OSCAR-11 BULLETIN-099 August

13, 1987

UOSAT MISSION CONTROL CENTRE

University of Surrey, Guildford, Surrey,

England

AO-10 UNAVAILABLE FOR USE

(ANS and DB2OS)

AMSAT-OSCAR-10 must not be used for communications for several months due to complete discharge of the on-board battery. The spacecraft initially went off the air on Tuesday, August 4, with the transponder off and the Engineering Beacon was discharging meaningless telemetry. The situation was corrected by Wednesday after the intervention of a command station to reset the IUH. The upset of transponder operations is likely to have been caused by a random glitch in the IUH output which commanded the transponder off. The IUH has been unusable since its memory has sustained massive radiation damage.

The sun angle is too low to allow adequate amounts of solar radiation to be absorbed by AO-10's solar panels - available power will be reduced to near-zero levels by late September. The entire satellite will then power down, the second episode in its life when complete power down has occurred. During these episodes, power levels are so low that no on-board electrical systems can be sustained.

Power down is inevitable since controllers no longer are able to manoeuvre the satellite's attitude in orbit. This ability was affected by the IUH engineering the magnetorquers in sequence and timing. Since the IUH is inoperative, the satellite's attitude stays fixed with regard to inertial space.

However, since the satellite and the earth move around the sun as a system, the attitude of AO-

10's solar panels, with respect to the sun changes seasonally. We are now approaching the worst season for AO-10 sun angles.

Total absence is required for a long while, until the sun-angle will be again good enough for charging the battery. The next period of communication via AMSAT OSCAR-10 will start around November 20, when illumination is better than 75 percent.

Until further notice from AMSAT - Do Not Use OSCAR-10!!

SOVIET EARTH RESOURCES SPACECRAFT LAUNCHED (ANS)

The Soviet Union has launched a 15 to 20 tonne Earth resources and ocean survey platform. It is the largest civilian survey spacecraft ever launched. Described as being the size of a school bus, the platform was orbited by a Proton booster on July 25, into an initial 175 by 105 mile orbit. This was later circularised to 147 by 154 miles. The object has been designated COSMOS 1870, object 87-064A, catalogue 18225. The spacecraft was launched from the Baikonur Cosmodrome at Tyuratam, about 0855 UTC, July 25. It should be an easy naked-eye object in the pre-dawn/post-dusk skies. The initial element set for COSMOS 1870 is given as follows:

Epoch	87214.85702392	
Element Set	24	
Inclination	71.9329	deg
RAAN	99.1022	deg
Eccentricity	0.00114570	
Arg of Perigee	280.9287	deg
Mean Anomaly	89.0415	deg
Mean Motion	16.08648753	rev/day
Drag	0.00061798	rev/day x 2
Rev No	137	
SMA	6628.6	km
Period	89.52	min
Apogee	228.09	km
Perigee	242.59	km

FUJI MODE JD REPORT

The following item was posted on BBS Bulletin Boards, including VK5AGR, and makes very interesting reading. The report originated from Barry VJ5JF.

On, for about five weeks.

Here are some observations and comments from one user of the BBS:

As of the end of July, approximately 40 stations in 11 countries have made use of the BBS. With the recent appearance of CE3XK, all continents are now represented. The list below shows the calls of the stations which have sent messages on the BBS. While the large number of JA calls is certainly not unexpected, the relatively small number of WVE and G calls, and the total

absence of others such as F, ZL, etc, is rather surprising.

CE3XK, DB2OS, DH4KAH, DL1CF, G3RUH, HB9MHM, HB9XJ, IJUX, JA1NVB, JA1OH0, JA2BGX, JA2PK1, JA3XJK, JA4BLC, JA8ERE, JA8TCH, JE3MXU, JF3KTJ, JHDWU, JJ1ZUT, JLSJHC, JR3FRF, JR4BRS, JR5BEL, K7PYK, KASLNV, ON4DY, ON5PV, ON6CK, ON6UG, VE3JF, VK2ZDE, VK3OTQ, VK5AGR, VK5ZK, WAEJRU, WA8EBM, WB5IPM, WB7QK, Z56IT.

Thus far, nearly all of the messages on the BBS have been short greetings between stations accessing the satellite. Very little traffic of the type that flows between the auto-forwarding terrestrial BBS stations is evident; this is probably due to uncertainties about the satellite's operating schedule and what stations are actually active on a regular basis, not to mention questions about third-party traffic legalities and the fact that most of the folks using the satellite are not also BBS operators. The uncertainty surrounding the operating schedule has been dispelled recently with the posting of a schedule through to September 9. The limited access time, due to power budget problems and time allotted to mode JA operation, is something we will have to live with. To put this in perspective, consider that mode JD (ie the BBS), is scheduled to be operating on a total of seven days during the month of August, and during those days it will be cycled on/off at two-hour intervals. This gives a station on the ground a maximum of about six-hours access time for the whole month, or less than one percent of the time that a geostationary satellite would be available. Moreover, there are gaps of as long as nine days in the schedule, so the time delay in delivering a message can be considerable; also, it seems that the on-board computer is powered down during some of the off periods, and all of the messages on the BBS get dumped.

There is also no way of telling whether a destination station has actually received your message, unless he sends you a separate message of confirmation. In short, the limitations will make it challenging to use FO-12 for any sort of serious message forwarding. Nevertheless, it is an extremely useful test bed for packet linking by satellite; and, the limitations just mentioned aside, the FO-12 hardware and BBS software have been functioning superbly.

The satellite has been used for some fairly lengthy file transfers between the DF3AV and VE3JF BBSs, with no problems whatsoever encountered. Now that the first batch of TAPR PSK modern kits has been shipped, there should soon be a considerable increase in the number of FO-12 BBS users. Stay tuned!

73, Barry VE3JF

SATELLITE ACTIVITY FOR THE MONTH OF MAY & JUNE 1987

1 LAUNCHES

The following launching announcements have been received:

INTL NO	SATELLITE	DATE	NATION	PERIOD	APG km	PRG km	INC deg
1987				min			

043E	USA 23	May 15	USA				
043F	USA 24	May 15	USA				
043H	USA 25	May 15	USA				
046A	Cosmos 1847	May 26	USSR	89.7	373	177	67.2
047A	Cosmos 1848	May 28	USSR	90.2	400	208	62.9
048A	Cosmos 1849	Jun 04	USSR	104.0m	39342	613	62.9
049A	Cosmos 1850	Jun 09	USSR	100.8	825	785	74.0
050A	Cosmos 1851	Jun 12	USSR	100.2	2940	1962	62.9
051A	Cosmos 1852	Jun 16	USSR	115.0	1507	1440	74.0
051B	Cosmos 1853	Jun 16	USSR	115.0	1507	1440	74.0
051C	Cosmos 1854	Jun 16	USSR	115.0	1507	1440	74.0
051D	Cosmos 1855	Jun 16	USSR	115.0	1507	1440	74.0
051E	Cosmos 1856	Jun 16	USSR	115.0	1507	1440	74.0
051F	Cosmos 1857	Jun 16	USSR	115.0	1507	1440	74.0
051G	Cosmos 1858	Jun 16	USSR	115.0	1507	1440	74.0
051H	Cosmos 1859	Jun 16	USSR	115.0	1507	1440	74.0
052A	USA 26	Jun 18	USA	89.7	283	255	65.0
053A	USA 28	Jun 29	USA				
054A	Cosmos 1861	Jun 23	USSR	105.0	1014	995	83.0

2 RETURNS

During the period 32 objects decayed including the following satellites:

1975-674A	Molniya 1-35	May 29
1987-032A	Cosmos 1835	Jun 04
1987-042A	Cosmos 1845	May 27
1987-045A	Cosmos 1846	Jun 04
1987-047A	Cosmos 1848	Jun 11

3 NOTES

1987-054 Cosmos 1861 is equipped with scientific instruments for determining the position of the USSR's sea vessels at any point, world-wide, and also radio equipment to provide amateur radio links for scientific and educational experiments.

The amateur stations have been designated RS-10 and RS-11. They have equipment operating in the 21 MHz, 29 MHz and 145 MHz bands.

The following spacecraft have radio beacons on frequencies less than 150 MHz.

1967-111A	ATS 3	136.47, 137.35 MHz	105.2 deg W
1975-100A	GOES 1	136.38 MHz	81.3 deg W
1977-044A	ETS 2	136.11 MHz	130.0 deg W
1977-046A	GOES 2	136.38 MHz	113.4 deg W
1977-108A	Meteorcast 1	136.74 MHz	123.8 deg W
1978-062A	GOES 3	136.38 137.19 MHz	135.6 deg W

—Continued by Bob Arnold VK3ZBB



IPS GRAFEX PREDICTIONS TAKE THE GUESSWORK OUT OF HF RADIO FREQUENCY SELECTION

Grab a GRAFEX and, during any particular month, GRAFEX will recommend the best:

- Times
- Frequency Bands
- Average radio wave elevation angles for radio wave propagation between any two places.

From \$16 a year GRAFEX will improve your transmission and reception.

For further information and to order your GRAFEX predictions, please contact:

**GRAFEX PREDICTIONS
IPS RADIO AND SPACE SERVICES
P.O. BOX 702
DARLINGHURST NSW 2010**

**IPS Radio and Space Services
162-166 Goulburn St. Sydney 2010
Telephone: (02) 269 8617**

Name:

Address:

Postcode:

BEACONS

Tim Mills VK2ZTM

PO Box 204, Willoughby, NSW. 2068

Work on the *Beacon Policy Paper* by FTAC is continuing and further input is required from members of the Amateur Radio Service, particularly in the microwave region. For example — what are the most desirable frequencies? Where does the operation which would most benefit from a beacon take place in the respective band? What are the proposed satellite frequencies? These are some of the questions FTAC would like from you, the user, as the formulation of any band plan is the general opinion and agreement of those who will make use of the finished product — the band plan.

Band planning for Australia has been conducted up to, and including, the 23 centimetre band. While this article is concentrating on the beacon contest of the microwave bands, input on the other modes within the band would be most welcome. In the microwave region, should the concept for a beacon be for an exact frequency, ending in the State identifier, eg VK2RSY 2304.420 MHz or should a national common frequency be used? In most cases, with Australia's widely separated population centres, it could be expected that only a single beacon for the region would be established. However, what happens if an adjacent region wishes to develop a system, do they share the frequency, or plan for a second or third allocation?

Part of the present thinking behind microwave beacon frequencies is that the Amateur Radio Service is the secondary service in most allocations and it would enable either one or two channel listing to be included nationally in the DOC AMFAR records. This, in turn, would assist with commercial planning. As mentioned above, your thoughts would be most welcome. Please forward your comments to the address at the head of this column.

The following appear to be beacon/general operating frequencies as found in local and overseas publications. Are they correct?

13 Centimetres

2300-2450 MHz, amateur secondary with 2400-2450 MHz, amateur satellite service. VK at 2304; G at 2320.850 (910 and .955) MHz.

9 Centimetres

3300-3600 MHz, amateur secondary with the amateur satellite service at 3400-3410 MHz. VK at 3456; G at 3456.00 (and .900) MHz.

5 Centimetres

5650-5850 MHz amateur secondary with the amateur satellite service at 5650-5670 MHz. Listing at 5760 MHz.

3 Centimetres

10,000-10,500 GHz amateur secondary with the amateur satellite service at 10,450-10,500. ZL at 10,250; VK6RUF at 10,300; G at 10,100, 10,368 and 10,400 GHz.

1.25 Centimetres

24,000-24,250 GHz amateur primary service with the amateur satellite service at 24,000-24,050 GHz (it is also an ISM allocation centred on 24,125 GHz). ZL at 24,150 and G at 24,100 GHz.

Other frequencies available to the amateur are at 47,000-47,200 GHz, primary and includes the amateur satellite service. 75,500 to 76,000 GHz primary are for both amateur and amateur satellite services. Secondary allocation is at 76 to 81 GHz.

The next band is 142-144 GHz primary amateur service and amateur satellite service, and secondary 144-149 GHz. The last band before the spectrum allocation stops at 275 GHz and is a secondary segment at 241 to 248 with primary frequency at 248 to 250 GHz. The amateur population may be a little light in this part of the spectrum!

Now, for a comment about a much lower frequency — 10 metres. Some years ago the first beacons were established on 10 metres, centred on 28,200 MHz, and extending down towards 28,150 MHz. A couple of systems were arranged to frequency change for five minutes every hour to 28,200 MHz. The sub-band of the North American Novice sub-band resulted in the exist-

ing beacons being frequency-changed to their mirror image above 28,200 MHz. In time, the allocation extended up to 28,300 MHz with a few above, as well as some below 28,200 MHz. About this time, the VK2 Division applied for a channel and were granted 28,2175 MHz.

The 28 MHz Beacon Project is sponsored and encouraged by IARU Region 1 — known as the International Beacon Project — and co-ordinated by Alan Taylor G3DME. Readers may ask what is the benefit of filling up so much spectrum space with systems which each occupy their own exclusive channel. Since the establishment of the various 10 metre beacons it has stimulated scientific interest in the propagation paths which are revealed by the reception of the beacons. In addition, they fulfill a practical role by providing signals on what, may otherwise be, a dead band.

Before VK2 established its beacon, it was decided that more benefit might be achieved by having several Australian beacons for the world to observe. A block allocation was requested and granted. The six channels were meant to have five located around the coast and one in the centre. However, it concluded with two in VK6. The systems are:

VK5WI Adelaide — 28,260 MHz
VK2RSY, Sydney — 28,262 MHz
VK6RWA, Perth — 28,264 MHz
VK8RTW, Albany — 28,266 MHz
VK8VE Darwin — 28,268 MHz
VK4RTL, Townsville — 28,270 MHz

Australia has more systems than any other part of the world.

A few years ago, the Southern Californian DX Association, developed the system which is located on 14,100 MHz. This approach uses a single frequency with time sharing between 10 systems which are located at various places throughout the world. Each beacon is given a time slot, recurring every 10 minutes where it transmits, progressively reducing its power in steps of 10. Beginning at 100 watts it steps down to 10, then one and finally 100 milliwatts. At present there is no Australian system. VK2 did apply, but was rejected. It is believed that if developed, an Australian system would most likely be established in the VK6 region.

A similar allocation has been internationally planned for 15 metres — 21,150 MHz — (see letter from Neil VK6NE, in August AR).

At the Region 3 meeting held in late 1985, the subject of the growth of 10 metre beacons was raised, and discussed. It has been decided to reduce the occupied spectrum to a segment at and below 28,200 MHz, using time-shared channels. There would be a prime international — including one Australian — channel on 28,200 MHz, with a further frequency; eg 28,195 for either all Australia or shared with others from our part of the South Pacific. From about 28,190 to 28,200 MHz, there would be a beacon group on each one kilohertz, with 10 per channel. They would be squashed-in, to say the least, requiring good frequency stability and time reference. January 1, 1990 is the anticipated time for this change to be completed.

It is expected that each beacon, in addition to its RF and keying systems, would require a controller which is able to maintain a time-slot with accuracy better than one second. It would probably need to power-step during its operating period. These changes have been decided internationally.

NOW, is the time for existing Australian 10 metre beacon operators to register their interest in operating the new concept from 1990. It is also time for any new groups to register interest. It is not known how many allocations will be available to Australia, but a list of all interested parties is required by the 1988 Federal Convention.

Please register with the FTAC Co-ordinator, PO Box 300, Caulfield South, Vic. 3162.

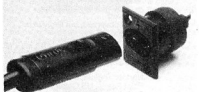
**REGISTER NOW BEFORE YOU
FORGET!!!**

HIGH POWER AUDIO CONNECTOR SYSTEM

Over the past 20 years, audio amplifier output has gradually increased to today's high level, commonly exceeding 1000 watts and often reaching 3600 watts. Until now, amplifier output connectors have remained largely unchanged to the extent that powerful and sophisticated equipment had to cope with connector systems developed in the "low signal 60s."

These problems of amplifier to speaker connection carrying high output have been solved by Utilux Pty Ltd, who have developed the revolutionary high power audio connector UX101 and UX501 series, which has the ability to transmit signals with a range from microvolts through to 30 amperes. This modern high power audio connector system is unique in that its output now has characteristics of both low level electronic signals and AC power supplies. It overcomes problems of safety and signal impedance by meeting electrical safety standards for low level AC voltage and by coping with the high output currents of today's amplifiers. The UX series solves all problems of existing connectors where applications require the usage of currents up to 30 amps and has been designed to meet the specific requirements of the professional audio industry of today.

The UX series comprises the UX101 (cable end connector) and the UX501 (panel mount socket), both featuring a genderless coupling system. The UX101 is a simple and supremely effective connector capable of carrying 30 amps or power of 3000 watts and complies with IEC safety standards. The UX101 mates with another UX101 or the panel mount socket UX501. The UX501 features an acoustic compression seal for mounting into speaker boxes and panels. When panel mounted, the UX501 has the same profile as a standard XLR female socket.



To summarise, the UX series offers:

- High current, large cable (8 x 14 mm) capacity with no risk of short circuit or shock. Terminated to 10 AWG cable, the connector temperature does not rise above the cable temperature even with continuous 30 ampere usage.

- The system is easily assembled using a soldering iron and screw driver. Contacts are supplied separately for soldering to the cable first, then snapped into the connector body. This eliminates the problem of melting the insulator housing when soldering to heavy cables.

- Fully assembled, the UX series provides the highest level of safety with total insulation between contacts and metal shell.

- The unique genderless format of the coupling system ensures correct polarisation and impossibility of any mismatches so common with conventional connectors.

- The UX series withstands up to 300 Newtons pull-out force before it releases, preventing equipment damage from accidental cable snags. A rugged diecast metal casing ensures superior durability that will withstand the rigours of field use.

- The distinctive oval shape positively differentiates amplifier to speaker connections from microphone, lighting and mains connectors, eliminating potentially disastrous misconnection.

- The UX series is made from high quality materials, eg copper alloy, silver plated contacts (gold plating optional), zinc alloy diecast outer shell and black thermoplastic rubber grommet to ensure a totally reliable performance. The UX series connectors have been extensively tested by the Utilux NATA registered laboratory and have



the IEC flash symbol displayed. The series was awarded an Australian Design Award in recognition of the advanced design principles that make the UX series the system of the future and a new standard in amplifier to speaker connection today.

For further information please contact: Utilux Pty Ltd, 14 Commercial Road, Kingsgrove, NSW. 2208. Phone: (02) 50 0155.

NEW MOBILE ANTENNA

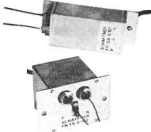
Chirnside Antennas have recently released a new set of mobile antennas.

The new mobile antenna is a two piece helical whip, unlike their very successful two-metre long mobile helical (which will remain in production) can, at times, be hard to store in a motor vehicle, when not in use. This new helical has a base section which is approximately .9 metres long. A top section which contains the winding for the appropriate band is approximately 1.1 metres long, including an adjustable stainless steel tip. This section then screws neatly into the base section, giving a total length of two-metres, having a chromed male fitting with a thread of three-quarters by 24 TPI. It accepts a standard ball mount (female) of three-eighths by 24 TPI. Consequently, it is possible to have an efficient antenna system which is also easy to stow in the boot of a car or similar.

The new helical has been released as a kit of: one base section, plus five top sections (80, 40, 20, 15 and 10 metres), and currently sells for \$169. They can also be purchased separately, one base section, plus one top section for \$49, with the additional sections available for \$35 each.

Special frequencies between two metres and 30 MHz can be made to order.

For further details contact: Chirnside Antennas, 26 Edwards Road, Chirnside Park, Vic. 3116. Phone: (03) 726 7353.



POWER LINE FILTERS

Instruments for telecommunication engineering and data processing can produce signals along the power cord, through which anyone not authorised can receive information.

The studies and limitation of such compromising signals are called TEMPEST. The Sc afnir filters FN 0.8/1.5/... are power line filters for very high demands, that were originally developed for suppressing electromagnetic interferences on motors.

These filters are also very suitable for use in the TEMPEST sector and are used more frequently.

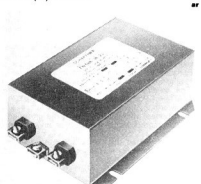
The new FN685 and FN686 two-stage power line filters, from Schaffner, have currents rated at 10, 25 and 30 amps (conservative ratings at 45

degrees Celsius, ambient temperature. They are especially suitable for applications such as central processors, industrial switchgear and industrial process control installations.

They have been designed for best attenuation characteristics in the frequency range of 10 kHz to 30 MHz.

The fully welded German silver cases and the several connection options allow these filters to be used in a wide range of applications.

For more information about the FN685 and FN686 power line filters, and TEMPEST filter types please contact: Westinghouse Systems 80-86 Douglas Parade, Williamstown, Vic. 3016. Phone: (03) 397 1033.



CURTIS 8044ABM KEYSER CHIP

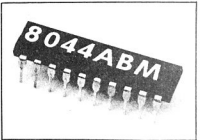
An enhancement of the popular 8044 keyer-on-a-chip has been introduced by Curtis Electro Devices. Called the 8044ABM, the CMOS device combines the functions of the 8044, 8044B, 8044M and 8044BM into one IC along with a new capability termed "negative weighting." Common keyer weighting circuits only add weight to dots and dashes by making them longer at the expense of spacing. By your switching a control on the 8044ABM, the weight control will either add or subtract from the code-element length. Negative weighting is useful in situations where the transmitter is adding unwanted weight that must be cancelled.

The new IC also has a control line to switch the iambic keying action between the "B" method used in some keyers and the usual Curtis "A" method. (The B method adds an opposite element when a squeeze-keyer paddle is released during the generation of a code element; the original Curtis method adds nothing.)

Although not pin compatible with earlier Curtis IC versions, the 8044ABM retains all other properties of the 8044 series, including dot and dash memories, key denouncing, self-completing code elements, an instant-starting clock, a built-in sidetone oscillator, an analogue speed indicator and extremely low power drain. Normally, the IC is operated from a five or nine volt DC source.

The 8044ABM is supplied in a 20-pin DIP plastic package and is priced around US\$20. For further information contact Curtis Electro Devices Inc, Box 4090, Mountain View, CA 94040. Phone: (USA) 415 964 3846.

Contributed by Gil Griffiths VK3CG, Pounding Brass Columnist as per Curtis Advertising Leaflet



Club Corner

PACKET RADIO ENTHUSIASTS GROUP

The Packet Radio Enthusiasts Group (PEG) was recently formed to co-ordinate the installation of Packet Netrom repeaters at Grundies Mount, near Nowendoc, and Magistrates Mountain, near Deepwater, NSW.

All the preliminary surveys and tests have proven the two sites as being most suitable for the project to establish packet highways from Sydney, Newcastle to Brisbane, and at the same time, giving access to coastal and tableland amateurs.

The co-ordinators of this group are Arthur VK2ATM, of Port Macquarie, and John VK2YGV, of Tamworth.

Any readers interested in joining the group are invited to contact the co-ordinators or any member of the group.

It is anticipated the digital repeaters will be operational as soon as the necessary licensing arrangements are finalised.

—Contributed by Pete Alexander VK2PA

Parap, and most recently, from the "Sports House", a location, which in its heyday was "The Drugs Store".

The current premises are part of the Department of Youth, Sport and Recreation's Sports House. Here the club has an airconditioned area set aside for their exclusive use. Part of the area is reserved for meetings, lectures and social gatherings with a separate area for the Club Station, VK8DA.

VK8DA comprises HF and VHF transceivers, also the two-metre (144.480 MHz) and six-metre (52.200 MHz) beacons, which use the call sign VK8VF. There is also an 80-metre AM transmitter which is used to relay the VK5WI Sunday Morning Broadcast.

The club also conducts novice theory courses from time to time. Active groups of members are also involved in RTTY and Packet.

Over the years, the club has built and commissioned two VHF repeaters. These are Channel 7000, located at Palmerston, 23 kilometres south of Darwin (considered a long-range repeater) and Channel 6700 which is located at Karama, in the northern suburbs. A UHF repeater, recently donated to the club, will be installed shortly in the Darwin city area on Channel 8275.

Club meetings are held on the first Monday of the month — rain, snow or hail — at 8 pm, at the clubrooms, Sports House, Waratah Crescent, Fannie Bay.

A special celebration will be held over the weekend, November 6, 7, 8, and an invitation, on behalf of club members, is extended to all past members of the club to visit Darwin so they may

GOLD COAST AMATEUR RADIO SOCIETY

The 10th Anniversary of the well-known Gold Coast Hamfest is scheduled for Saturday, November 1, 1987, at the Albert Waterways Complex, Hooker Boulevard, Broadbeach, Surfers Paradise.

This year, to create even greater interest, it is proposed to incorporate other hobbies and displays, consequently it will be known and advertised as:

The Gold Coast Amateur Radio and Hobbies Festival

The change in concept, will, it is felt, make a greater impact on the public and possibly encourage more interest in amateur radio as a hobby.

Further details, if required, may be obtained from the Gold Coast Amateur Radio Society Inc., Box 588, Southport, Qld. 4215, or telephone the organiser, (075) 58 2293.

—Contributed by Ken Ayers VK4KD, Organiser, Gold Coast Amateur Radio Society Inc.

RADIO AMATEURS TRS80 COLOUR COMPUTER GROUP (Aust)

Following is information concerning weather facsimile, facsimile and RTTY frequencies and other relative data of interest to users of home computers which are capable of receiving these modes.

The data is current and has been compiled by members of the Radio Amateurs TRS80 Colour Computer Group in Australia. The group meets each Friday evening, at 1130 UTC, on 3.605 MHz. The group welcome all computer users, especially users of the TRS80 Colour Computer.

See opposite page.

NOTATIONS:

- X = positive identification
- ? = doubtful mode
- Varies = no strict time schedules observed
- Possible = not observed, but likely to be included

New agencies such as Reuters, Tass, UPI may, or may not, transmit call teletype code or 170 Hz shifted TTY.

NAM	Norfolk Virginia, USA
NMC	Point Reyes, US Coast Guard, California, USA
AXI	Darwin, Schedules at 1200 hours for part (A)
NWS	National weather service, San Francisco, California
WWD	La Jolla, California, USA
NPM	Hawaii, relays to Guam
Tass	Russian Newsagency
AFP	Associated French Press
UPI/VOA	United Press International, Voice of America relay
Kyodnews	Japanese Newsagency
CNDA	Central Newsagency Taiwan

All times are in UTC and frequencies are plus/minus. Many stations transmit independent sideband signals (ISB). Interfering signals can usually be cleared by tuning to the opposite sideband and fine tuning for best results. Note that weather facsimile stations are very keen to have reception reports, along with facsimile printouts for verifications. Many will reply with handsome confirmation replies for your reports if correct, along with station details and schedules of transmission times and etc.

Many FAX stations transmit long printouts and thus it is not always possible to obtain positive identifications of their origin. If you have data on those stations listed above, a note to the author, with as much detail as possible, would be greatly appreciated. This information will help update the listings and will assist others greatly in the future.

Happy listening!

—Contributed by Colin Stevenson VK2CS, PO Box 109, Mount Drunit, NSW 2770

WAGGA WAGGA AMATEUR RADIO CLUB
Due to unforeseen circumstances, the Wagga Wagga Amateur Radio Club Convention adver-



Members of PEG from left: (back) Trev VK2YCB, Bruce VK2KBB, Gordon VK2ALM, Arthur VK2ATM, Les VK2BD, Stewart VK2TNS, Bill VK2ZCV, Laurie VK2ALM. (Front) Pete VK2PA, Dick VK2KRA, Des VK2AGA, John VK2YGV and Norm VK2TOR. Missing from the photograph is Ian VK2XU.

DARWIN AMATEUR RADIO CLUB

The Darwin Amateur Radio Club Incorporated will be celebrating its 21st birthday this year. The club was formed at a gathering of interested amateurs, in Nightcliff, on November 7, 1966. The original club was named *The Darwin Radio Club*. This was changed in 1972 to *The Darwin Amateur Radio Club*. In those days there were not many permanent resident amateurs in Darwin, with a large proportion of the residents being Public Servants. That, of course, is history now. The club membership sees people from all walks of life, with a common hobby, coming together to share ideas, ambitions and friendship.

Over the years, the club has operated from many locations around Darwin. Some recent locations have been the Emergency Services Bunker, at East Point in an old World War II Bunker, the Darwin Community College, Casuarina High School, the Old Police Headquarters in

take part in the celebrations. There will be a Formal Dinner on Friday, 6th. A barbeque/swim birthday party on Saturday, 7th, and a nostalgic tour of Darwin.

Also, as part of the celebrations, the club is offering a special award for all amateurs. This will be in the form of a large card suitable to hang on the shack wall. Requirements for the award are: One contact with the club station, VK8DA, during the periods, Tuesday, October 6, to Thursday, November 5, 1987.

Cost of the award is \$5. VK8DA will be operational at the following times:

Monday to Friday — 1000 to 1200 UTC
Saturday — 0400 to 0800 UTC
Sunday — from after the VK5 Broadcast (which begins at 0900 Adelaide-time — beware of daylight saving) to at least 0230 UTC. There will also be RTTY operating on Sundays during this time, frequency 14.080 MHz.

Frequencies monitored will be: 3.580, 7.080, 10.125, 14.180, 21.165, 28.500 MHz. These frequencies will be plus/minus QRM.

For further information contact the President, Bill Murphy VK8ZWM, on (089) 27 1616, or QTHR.

—Contributed by Bill Murphy VK8ZWM, President, Darwin Amateur Radio Club Inc.

tised to be held over the weekend, October 24 and 25, 1987 has been postponed indefinitely.

—Contributed by Peter Clew VK2KZ, Wagga Wagga Amateur Radio Club

BALLARAT AMATEUR RADIO GROUP

At the Annual General Meeting of the Ballarat Amateur Radio Group Inc, the following office bearers were elected for the year 1987/88.

President	Ron Watkins VK3XOA
Immediate Past President	Bob Terrill VK3BNC
Vice-President	John Hazledine VK3CFH
Secretary	Jim Wright VK3CFB
Ass Sec/Treasurer	Harry Hwikkema VK3KGL
Publicity Officer	Gordon Cornell VK3PUW
Education Officer	Ian McDonald VK3AXH
Net Co-ordinator	Reg Carter VK3CAZ
Technical Officer	Dick Forrester VK3VU
Members Representative	Neil Davidson VK3KQQ

The Group meets on the last Friday every month, except December, at the Ballarat Education Centre, Hopetoun Street, Ballarat, at 7.30 pm. New members and visitors are welcome.

The BARG net operates on Thursday nights, 0830 UTC, on 3.610 MHz, with three awards available.

—Contributed by Gordon Cornell VK3PUW, Publicity Officer

WRISTWATCH PAGER

○ The British electronics company Plessey, will make two custom-built chips to receive messages via radio and process them into a form that can be displayed on the watch face.

The technology is believed to be a bipolar for the the receiver and a CMOS to do the processing.

Industry sources see the breakthrough leading to production of a wristwatch containing a telephone pager.

ADVERTISE YOURSELF AND/OR YOUR BUSINESS

Amateur Radio has been conducting a new advertising feature for those business people who have a message they want to publicise, yet do not want to place a large advertisement.

Send your business card to the Advertising Manager and it will be reproduced in the magazine, one column wide, for \$25.00 per issue.

The Editor reserves the right to refuse any material that he considers unsuitable.

For further details contact:

The Advertising Manager
PO Box 300,
Caulfield South, Vic. 3122

FREQ	WEFAX	RTTY	FOTOFAX	U.T.C.	SSB	SWEET	CALL
3.357	X	-	-	VARIES	USB	VARIES	NAM VIRGINIA
3.523	X	-	-	1300	LSB	120	?
3.625	X	-	-	VARIES	LSB	120	RUSSIAN
3.635	X	-	-	1610	LSB	120	?
4.295	X	-	-	1345	USB	120	?
4.310	X	-	-	1400	LSB	120	?
4.346	X	-	-	VARIES	USB	120	NMC CALIFORNIA
4.394	X	-	-	1550	USB	120	?
4.975	X	X	X	24HRS	USB	120	NAM VIRGINIA
5.096	X	X	X	VARIES	USB	120	AXM CANBERRA
5.112	X	-	-	1350	USB	VARIES	?
5.462	X	-	-	1345	USB	120	?
5.697	X	-	-	24HRS	USB	120	ZKLF-N.Z.
5.735	X	-	-	VARIES	USB	120	AKI-DARWIN
5.764	X	-	-	1630	USB	VARIES	?
5.804	X	X	X	24HRS	USB	120	ZKLF-N.Z.
5.894	X	-	-	?	?	?	GUAM
6.336	X	-	-	1500	USB	120	?
6.845	X	X	-	.....	.....	.....	REUTERS
6.930	X	X	-	.....	.....	.....	TASS
7.449	X	-	-	1445	USB	120	POSSIBLY NPM GUAM
7.474	X	-	-	1220	USB	120	POSSIBLY AXM?
7.528	X	-	-	1400	USB	90	?
7.532	X	-	-	1305	USB	60	?
7.535	X	-	-	VARIES	USB	120	AXI DARWIN
7.748	X	-	-	1515	USB	60/120	MOSCOW
7.542	X	X	-	.....	.....	.....	APF HONG KONG
7.655	X	X	-	.....	.....	.....	CNA TAIWAN
7.768	X	X	-	.....	.....	.....	TASS
7.894	X	X	X	24HRS	USB	120	GUAM
8.027	X	-	-	24HRS	USB	120	NAM
8.078	X	-	-	0700	USB	120	NAM
8.457	X	-	-	1005	USB	120	?
8.465	X	X	X	1245	USB	120	KYODONEWS
8.466	X	X	X	?	USB	120	WFO CALIFORNIA
8.602	X	-	-	?	USB	120	NMC USCG CALIF
9.043	X	-	POSSIBLY	1545	USB	120	KENYA NET CTR.
9.058	X	-	-	1435	USB	120	RUSSIAN
9.110	X	X	-	.....	.....	.....	TASS
9.228	X	-	-	1430	USB	120	?
9.357	X	-	-	1645	USB	120	NO ID.
9.396	X	X	X	0715	USB	120	USA?
9.439	X	-	-	24HRS	USB	120	ZKLF-N.Z.
9.568	X	-	-	0900	USB	120	?
9.963	X	X	-	.....	.....	.....	UPI VOA
10.115	X	?	?	?	?	?	UNKNOWN
10.218	X	-	-	1225	USB	60	RUSSIAN
10.255	X	-	-	24HRS	USB	120	GUAM
10.248	X	-	-	0640	USB	120	?
10.270	X	X	-	.....	.....	.....	TASS
10.555	X	?	VARIES	USB	120	120	AXI DARWIN
10.960	X	X	-	24HRS	USB	120	REUTERS
10.978	X	-	-	24HRS	USB	120	MOSCOW
11.007	X	-	-	1500	USB	VARIES	CHINA FAX NEWS
11.030	X	-	-	VARIES	USB	120	AXM SYDNEY
11.090	X	-	-	0630	USB	120	?
11.470	X	-	-	.....	.....	.....	TASS
12.005	X	-	-	.....	.....	.....	TASS
12.728	X	?	VARIES	USB	120	120	NMC
12.737	X	-	-	1700	USB	120	?
12.826	X	-	-	1700	USB	120	?
13.410	X	X	-	.....	.....	.....	TASS
13.469	X	-	-	1700	USB	120	?
13.530	X	?	2015	USB	120	120	ZKLF
13.595	X	-	-	0900	USB	60	CHINA FAX NEWS
13.563	X	X	-	.....	.....	.....	CNA TAIWAN
13.918	X	-	-	VARIES	USB	120	MELBOURNE
14.365	X	-	-	NO INFO AVAILABLE	.....	.....	?
14.443	X	-	-	NO INFO AVAILABLE	.....	.....	?
14.461	X	-	-	NO INFO AVAILABLE	.....	.....	?
14.510	X	X	-	.....	.....	.....	TASS
14.515	X	X	-	.....	.....	.....	REUTERS
14.609	X	-	-	1800	USB	120	?
14.683	X	X	X	0930	USB	60	CHINA NEWS
14.700	X	X	-	.....	.....	.....	TASS
14.823	X	-	-	VARIES	USB	120	NPM HAWAII
14.981	X	-	-	0200	USB	120	NO INFO
15.615	X	-	-	?	?	?	AXI DARWIN
15.990	X	X	X	24HRS	USB	120	GUAM
16.018	X	-	-	0200	USB	120	?
16.220	X	-	-	?	?	?	AUCKLAND NZ
16.232	X	-	-	.....	.....	.....	UPI VOA
16.340	X	-	-	24HRS	USB	120	ZKLF-N.Z.
16.410	X	?	?	?	?	?	NAM
16.592	-	X	-	?	?	?	CHINESE FAX
16.969	-	X	-	0100	USB	60	KYODONEWS
17.050	X	-	-	0130	USB	?	RUSSIAN
17.060	X	-	-	0130	USB	60	JAPANESE
17.150	X	?	-	NO INFO AVAILABLE	.....	.....	NWS CALIFORNIA
17.411	X	-	-	NO INFO AVAILABLE	.....	.....	WFO CALIFORNIA
17.596	X	-	-	.....	.....	.....	KYODONEWS JAPAN
19.273	X	-	-	NO INFO AVAILABLE	.....	.....	?
19.520	X	X	-	.....	.....	.....	UPI VOA
19.527	X	?	WX SUMMARY	N. HEMISPHERE	?	?	?
19.960	X	X	-	24HRS	USB	120	GUAM
20.815	X	-	-	NO INFO AVAILABLE	.....	.....	NAM
22.910	X	X	X	24HRS	USB	120	GUAM

RTTY and Facsimile Broadcast Frequencies

Prepared by Colin Stevenson VK2CS, courtesy the Radio Amateurs TRS80 Colour Computer Group.
 Continually updated — revised July 28, 1987



VK2 Mini-Bulletin

Tim Mills VK2ZTM
VK2 MINI BULLETIN EDITOR
Box 1066, Parramatta, NSW. 2150

VK2BQK MUSEUM STATION FINDS NEW HOME IN NEWCASTLE

The station, which featured with a cover photograph and article in September 1985 *Amateur Radio* has been transferred to a new Newcastle Regional Museum, which is being established at an old brewery, in Hunter Street. A committee to assist with its re-establishment has been formed by the Hunter Branch Radio Group and Westlakes Amateur Radio Club. These clubs will be able to advise the progress of the station from time to time.

810s LOCATED

Thanks for the 810s. Following the requests in recent notes, several small donations have averted extra gray hairs for the Dural staff. However, more are required so please keep them coming.

DIVISIONAL PACKET BULLETIN BOARD — VK2AWI

Thanks to Andy VK2AAK, the Division is conducting a trial Bulletin Board on Channel 7600, in the Sydney region. A range of information, including some of the weekly VK2WI broadcast notes, may

be found on this board. Arrangements are being made with other boards to exchange this information to enable it to be available in your area. Items for the Sunday broadcasts may be left — by Friday — addressed to VK2KFL.

SOME COMING EVENTS

A WICEN exercise will be held on October 10/11, in conjunction with the canoe classic on the Hawkesbury.

JOTA will be held on October 17/18.

The Wagga Field Day, to be held October 24/25, has been postponed. (See Club Corner for further details).

The Conference of Clubs, hosted by Westlakes, will be held on November 1.

A Trash and Treasure day will be held at Parramatta on November 29.

ODDS AND ENDS

Gladesville Amateur Radio Club, in conjunction with the Division, conducted a trial NAACP and AACP examination at *Amateur Radio House* on August 8. This proved to be a most successful operation, and it is anticipated another one will be held in early November. Some additional VHS tape formats of the 1984 Seminar are now

available for borrowing from the Parramatta Office. Have you kept the QSL Bureau up to date with your requirements for handling your inwards cards? Advise the office or the Bureau direct of any change. Have clubs ever considered having details of their activities included in your regions tourist brochures and leaflets? Why not inquire, as most are now due for reprinting for 1986. Talking about 1988 — what will you or your club be doing special during the year? Advise the office so that a central register can be maintained.

NEW MEMBERS

Welcome to these new members who were in the August intake.

L W Adams Assoc	Toukley
J M Bogdanski VK2FEX	North Nowra
N F Fallshaw VK2XNF	Balgowlah Heights
J F Ferrington VK2VOX	Carlingford
M J Harvey VK2JMJ	Tamworth
N Jenio VK2FHY	Pymble
S W Mulligan Assoc	Moree
T J Noonan Assoc	Whalan
B R Stiles Assoc	Ryde

VK3 WIA Notes



WHAT TO DO WITH THOSE QSL CARDS
At its July meeting, the Council of the WIA (Victorian Division) approved a motion to establish a WIA QSL collection.

It is realised that, in the past, many QSLs, like old photographs, have been lost forever, but a start can be made now. The Collection is, at present, being arranged for display purposes and any WIA member may borrow the display (or part of it) by making arrangements through the Curator, Ken Matchett VK3TL, on telephone number (059) 64 3721, or by leaving a message at the WIA rooms in Brunswick Street, Fitzroy — Monday to Thursday, before 3 pm, phone (03) 417 3535.

The collection consists, not only of rare and historic QSLs, but also modern-day ones which have artistic appeal. The thematic collection, in particular, will be of use for display purposes in school radio clubs and radio exhibitions. The main aims, of course, apart from the historic one, is to try to make amateur radio appeal to young people, and to give the WIA more publicity.

Already there have been kind donations of QSLs from Ken Roberts VK3BXN and Ivor Stafford VK3XB. The son of the late Ray Jones VK3RJ, has also donated many of Ray's QSLs collected over the years.

The WIA asks its members to donate their unwanted QSLs, of any kind whatsoever, to its collection. These can be left at the WIA rooms in Brunswick Street, or you can simply leave a telephone message with the volunteer on duty at the WIA rooms, so that the QSLs can be collected from your home. No collection is too small. Can you help?

—Contributed by Ken Matchett VK3TL, Curator

NEW MEMBERS

A warm welcome to the following new members.

Bernard Ferguson	Glenroy
VK3FN	Williamstown
Laurence Hick VK3MAD	Black Rock
David Hull VK3KDL	Mentone
Gary McWilliam	Seville
Ken Matchett VK3TL	Montrose
Michael Ryan VK3EMR	Bright
Adam Williams	

MORSEWORD 7

Compiled by Audrey Ryan
30 Starling Street, Montmorency, Vic. 3094

ACROSS

1. Jetty
2. Perceives
3. Bottom
4. Appointments
5. Tear apart
6. 'Come into the garden ...'
7. Affirm
8. Gossip
9. Resin
10. Cleft

DOWN

1. Improve
2. Curve
3. Fail
4. True
5. Whole
6. Vessel
7. A set
8. Final
9. Daybreak
10. Exclamation to attract attention

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	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

Solution page 61.

Five-Eighth Wave



QUESTIONNAIRE

Here, at last, are the results of our questionnaire regarding novice privileges on two-metres. As you can see the answers were not as clear-cut as we imagined they would be, and I think our team at the Federal Convention could be forgiven for thinking that they had done the right thing! In fact, out of about 900 possible voting members, we only received 167 replies — which I think shows that many members do not care either way. On the original question, we would have to say that our Division is opposed to it, but only 34 of the 167 were totally against any extension of novice privileges, so the majority were in favour of some extension. However, there were no clear indications as to where this should be. Even those who favoured part of the two-metre band could not agree on which part. Some said that they should have access to satellites, some said 'no satellites'; some said yes to repeaters and some said no repeaters on any account! I think that we will all be interested to see the results of Questionnaires and votes taken in other Divisions to see if they get a clearer indication than we did!

QUESTIONNAIRE RESPONSE

1. Do you agree with the proposal put forward at the Federal Convention, namely that — two-metre privileges be extended to NAOCPL licensees under the following conditions;

- (a) use of NAOCPL power restraints
- (b) use of all current NAOCPL modes plus FM telephony on the 144-148 MHz band only.
- (c) access to the full band be granted, and
- (d) no digital privileges be granted.

YES: 71
NO: 96

2. If NO, then:

(a) Do you oppose any extension of novice privileges?

YES: 34 NO: 71

(b) Would you agree to novices using PART of the two-metre band?

YES: 34 NO: 64

(c) If so, which part? (A range of frequencies and modes were given but no trend was evident)

(d) Would you prefer six-metres as the common band?

YES: 34 NO: 58

(e) Would you prefer 70 centimetres?

YES: 23 NO: 72

The VK5 Council appreciates your response and especially those who added written comments.

—Questionnaire Response prepared by Don McDonald, Hon Sec

SILENT KEYS

It is with regret that we mourn the passing of two well-known South Australian amateurs, Pete Bowman VK5FM, and Ray Foxwell VK5FEZ. Death is never easy to bear but at Pete's age it is perhaps more acceptable. Ray's death at 46 was a tragic blow to his family and many friends, particularly in the ATV fraternity. I hope that someone who knew these amateurs better than I, will write up something for the magazine. Those of us who knew Max Hull VK3ZS, were also saddened to learn of his passing. You may remember that Max, as Federal Historian, was our Guest of Honour at last year's Clubs' Convention. Our sympathies are extended to the families of all the above.

DIARY DATES

OCTOBER 27 — Our speaker or speakers will be from the monotheronic Prediction Service, in Sydney. They have offered their services for this night, but have asked that it be an open meeting for all those interested in radio, accordingly, we ask you, if you know of anyone outside the WIA who might be interested in coming along, to please extend an invitation to them. We will try and start the meeting at 7.30 pm that night, so that it will not run too late.

OOOPS!! (A correction & an apology)

Under the heading of *Where are they now?* (this column of April 1987), I relayed the information regarding the whereabouts of the former mem-

Jennifer Warrington VK5ANW
59 Albert Street, Clarence Gardens, SA. 5039

bers of the Mount Gambier High School Radio Club. I also said that six of those members were unfortunately deceased. Seems I was wrong. My friend, Col Ferguson VK5CJ, from Mount Gambier, informs me that his long-time friend Rex 'Cutsy' Sullivan, is still very much alive and well and living in Adelaide. So, my apology for the mistake, and if Rex ever gets to see this, I hope he will forgive me!

AHARS GIANT RADIO TRASH AND TREASURE DAY

WHEN... Saturday, November 7, 1987. Starting time at 10 am.
WHERE... Westbourne Park Memorial Hall, 390 Goodwood Road, Westbourne Park, just south of 'Big W'.

Sellers can begin setting up from 9 am. AHARS will ask 10 percent of sales to cover the hire of the hall, etc, up to a maximum of \$10 per item; ie for any item over \$100, only \$10 will be asked.

It is expected that it will finish around 2.30 pm.

I can personally recommend that if it anything like last year, it will be worth a visit, both for the bargains and the number of amateurs to chat with, and Marshall VK5FN, will be pleased to sell you a pastie for lunch so that you don't even have to go home to eat! Tea and coffee are also provided. If you would like further information, ring Gordon Welsh VK5KGS, on 296 9278, or at work on 382 7777.

JUBILEE 150 AWARD RECIPIENTS

1398 VK6NKB
1399 DL9ZAL
1400 VK3YH
1401 YC1DOA
1402 UW3IN (First European Russia)
1403 VK3APH
1404 W5JWV
1405 VK2VMX
1406 JA2PGU
1407 UR2DL (First Estonia)
1408 UW3QOT
1409 ZL3RH

VK4 WIA Notes

Bud Pounsett VK4QY
Box 638, GPO, Brisbane, Qld. 4001



EXPO 88 UPDATE

There still is not very much more to update since our last report. John Aarsse VK4QA, and Theo Marks VK4MU, our spokesmen on the Queensland Division's Expo Committee, have had further meetings with the Authority. Some broad decisions have been made.

As a fore-runners to Expo 88, which runs for six months from next April, the Authority will provide some 200 000 QSL cards to publicise Expo 88 around the world. These will be available to all Divisions for distribution.

The major task will be the setting up of an amateur radio exhibit and station at the South Brisbane site. The object of this will be threefold:

- to provide the public with an overview of amateur radio
- to provide a meeting place for visiting local, interstate and overseas amateurs, and
- it will give the Expo station, V188EXPO, its proper location, right there on the spot.

Already negotiations are underway to procure equipment for this project. It is envisaged that all modes will be catered for. The Authority has already agreed to the erection of suitable antennas on the roof of whatever building houses our exhibit.

The exact location has, as yet, to be decided and it is hoped that the Queensland Building will be the one. The manning of our display has been the subject of much discussion and was voted the greatest problem. However, it now seems that our early fears may have been somewhat premature. Many clubs and individuals have promised support for this six-months long event, the biggest undertaking yet of the VK4 Division.

World Expo 88, in Brisbane, from April to October 1988, will be a grand affair, especially if you are an amateur. Make plans now to visit Brisbane in 88 during Expo.

73 Bud VK4QY

PACKET RADIO WARNING

The introduction of packet radio as an easily-affordable medium for the amateur enthusiast has brought about an equally undesirable side-effect: the packet channels are being jammed for long periods because of faulty design in the hardware or software of the unit involved. This is somewhat equivalent to having the local repeater jammed with a constant carrier, and renders the channel unusable for other users.

All terminal node controllers (TNCs) are meant to be fitted with a "watch-dog timer", to prevent them from transmitting for longer than a certain period. The usual fault appears to be, that when the computer is switched off, the "PTT" line to the transceiver "floats" low, thereby keying up the transmitter. This timer will cut off the transmitter after a certain period, usually after a minute or so. Another problem is that the computer may "crash" in mid-transmit, leaving the rig keyed up.

However, in the interests of economy, certain commercial TNCs do not have this timer fitted. Various home-brew and kit designs may also have neglected this circuit. In the interests of all packet users, please check your TNC to ensure that a timer has been included. It is a simple matter to fit one, involving just a 555 timer chip, and also to make sure that the PTT line cannot float.

Contributed by Dave Horsfall VK6KFU

Over to You!



RESPONSE TO HOW'S DX?

I have been receiving *Amateur Radio* for about three months now, thanks to my friend Mark VK2FVL, and I enjoy it very much. About QSLing, or the lack of it, I agree with Ken VK3AH, 100 percent. I have sent as many as three SASE, IRCs or cash, and have received no response. I also have had two returned marked not in log which indicates to me that the DX station is not keeping good records.

I think *Amateur Radio* and QST should publish this information. I know this would be very difficult as the information is by "word of mouth" and may not be reliable.

I enjoy "How's DX?", "Over to You" and the stories, especially the one about the amateurs who recovered the stolen yacht.

73

Gene Goin ND5H,
2514 Manila Lane,
Houston, Texas, USA. 77043

MANY THANKS

Many, many thanks for being so kind as to print my photographs in *AR* magazine. They look really great! Also, many thanks for the information about me. It is marvellous.

I began receiving some very nice comments about it on the air — everyone is so kind to me and I am very grateful indeed.

I will forward details about another DX-trip prior to my departure. I will also forward any interesting amateur radio information I may receive for publication in *AR*.

All the very best.

73

Zbig (Frank) Murdzia VK2EKY,
PO Box E450,
Sydney, NSW. 2000

AMATEUR LICENSING SYSTEM

I would like to comment on the amateur licensing system operating in this country.

1. I believe in the retention of Morse code — both sending and receiving — as a prerequisite for operation below 30 MHz, as it is the simplest and most effective way of covering distance using low power in QRM and QRN. Modest QRP CW equipment for 80 metres can cover up to several hundred kilometres with interstate communication sometimes being achieved.
 2. The extension of the novice CW licence from two-and-a-half-minutes to five-minutes.
 3. The cost of equipment is a deterrent to newcomers to amateur radio. Home-building is an attractive proposition, but the licensing system should be geared to it. I believe the novice licence should permit only home-assembled equipment on the bands as it is so inexpensive, especially for CW transmitters, as many of the parts can be salvaged from old television sets. Increased building of equipment would create a market for traditionally hard-to-get components; eg crystals, variable capacitors, vernier dials, valves, etc, which would benefit the whole amateur fraternity.
 4. Novices be restricted to CW, AM, DSB and FM, on six and 10 metres. The loss of SSB for novices would not be a significant one (page 4, *AR*, April 1982). DSB equipment is much simpler than SSB transmitters (refer to Lo-Key Journal of CW Operators QRP Club, March 1987, for a two-valve DSB rig).
 5. Novice power limits should stay the same.
 6. 160 metres is underused. I believe by making it a novice band will enhance the band and make it more occupied.
- Because of crowding I feel the 80 metre band should be given in whole to the novice operator. 10 metres could be a good band for local contacts and I feel novices should be allowed to use all the band, including FM privileges. The

52-54 MHz band would be ideal as a common band for all classes of licences because six-metre equipment is not as critical to construct as is two-metres and 70 centimetre equipment.

New Zealand CB crystals could be used in six-metre equipment by using a third overtone oscillator to get 26 MHz, and a frequency doubler. This would enable the novice to construct a transmitter with crystals available on both the primary repeater channels and the simplex frequencies.

7. The examinations could be made more relevant; eg there could be more questions about things like direct conversion and regenerative receivers, instead of superhets, and CW, AM, and DSB theory instead of SSB theory. Also, less transistor and component theory. The prospective novices would learn more about the equipment that they will be building and using.

I believe that this new novice licence, particularly the compulsory home-brewing of ATUs, transmitters and antennas, would enrich the hobby greatly. I do not think commercial equipment advertisers would like this proposal, but I believe it is the best system for the hobby of amateur radio.

I also think allotting two-metres to novices is detrimental as this further raises the cost of amateur radio; eg an 80-metre regenerative receiver costs only a few dollars to construct, but I doubt you could build a two-metre receiver for the same amount. The same applies for transmitters. Two-metre equipment is not as easy to construct as 3.5 MHz equipment.

Yours faithfully,

Peter Parker VK6NBN,
C/- Post Office,
Witchcliffe, WA. 6286

Peter is aged 15, and has designed and supplied a series of easy, inexpensive to construct rigs, which will be published in Amateur Radio shortly.

ATN NET

It was a real plus for amateur radio in Vanuatu, when we were able to make contact with the ATN Net, during Cyclone Uma, and I thank all for their fine assistance and the time given by all during our period of need.

The people of Vanuatu were very quick in showing appreciation for this community service.

Again many thanks for your concern about our welfare during our crisis.

Yours faithfully,

Tax Watson YJ8OK,
(Member of the WIA)
Box 683,
Port Vila, Vanuatu

THE EQUAL TEMPERAMENT VFO?

A mind-bender?

The occasion whereby my Son's (VK2MRL), TS-130S transmits 100 or so Hertz higher than it receives (the correction details having been kindly supplied by Tod VK2EHT), coupled with the fact that many amateurs also enjoy music-playing, prompts me to share some recent interesting research which I have done regarding individual note frequencies of keyboard instruments.

It so happens that a single note melody becomes more pleasurable to our ears when additional notes, such as thirds and fifths; ie E and G added to the tonic C, are included to form a chord. The "open" strings of a violin are tuned with an interval of perfect fifths. That is to say, the third harmonic of a string is exactly the same frequency as the second harmonic of the string immediately above it. In addition, a violinist, whilst playing, naturally adjusts string lengths to produce perfect intervals.

Not so with say, the piano; the strings are pre-

set by the tuner. Unfortunately, two important criteria which should be met are impossible to reconcile.

In the first place, octaves have to be related in the same manner that we double from 3.5 Hz to 7 MHz, and again to 14 MHz and secondly fifths which have a ratio of 3:2, or more correctly, 1.5:1 should follow the same rule.

Now, from bottom C to top C embraces seven octaves whilst the number of fifths included is 12. Two to the seventh power can be mentally deduced as 128 and a quick poke at the ever handy calculator shows that 1.5 to the 12th power is 129.74634. Since the frequency of bottom C is 27.5 Hz, it follows that $1.5 \times C$ must be 3520 Hz and 3568 Hz at the same time. This delicious and mysterious anomaly has been called a Pythagorean Comma and, whilst it is true that 50 odd-Hertz off net during SSB reception does not unduly detract from clarity, a much smaller error can make one wince when listening to music, particularly in the middle register. In fact, in early times, when keyboard tuning was in perfect thirds and fifths, there was one key in particular that had a note so far out that its disharmony was nicknamed "The Wolf". I suppose it seemed to howl!

After much argument and discussion between musicians and mathematicians, together with subjective experimentation, a compromise was eventually reached wherein the error was distributed over the whole keyboard in such a manner that the octave relationship is correct in all keys and the intermediate note errors are so small that all, but an experienced violinist, (for example) are unaware of them. This is done by making consecutive note intervals conform to the frequency ratio equal to the 12th root of 2:1.

$$\left(\sqrt[12]{2}\right)$$

$$\text{or } 2^{1/12}:1$$

The calculator sequence $2^{1/12} \times =$ will produce 1.0594631 which, when stacked in the K function or memory, allows calculation of any note on the keyboard. (Or load the computer for total readout).

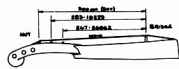
My musical friends of the air will be aware that the evolution of the Equal Temperament scale and an instrument so tuned, prompted the great composer Bach to write 24 preludes and 24 fugues (one in each of the major and minor keys) known as *The Well Tempered Clavier*. I sincerely hope readers will find the above account interesting and strive to live without a "wolf". Hi!

Incidentally, wonders will never cease. I have discovered that the inverse of 1.0594631; ie 0.9438743, poked in the K function (ie 0.94387431 \times K) then 300, =, =, =, = allows calculation of fret positions on guitar-type instruments (from F=1ft).

(On my TI30, each "=" press gives the next fret position).

Yours and 73,

Don Law VK2AIL,
RMB626 Adelong Road,
Tumblong, NSW. 2729



ON MY TI30 EACH "=" PRESS GIVES THE NEXT FRET POSITION

LOSING MEMBERSHIP!

May I add a small contribution for the reasons why the WIA is losing membership.

As a country member, as far as I know, I am the only amateur in my area who has remained in the Institute. At least 15 of my amateur friends have dropped out over the past few years. They all say that I am mad to remain a member and surely they all cannot be wrong.

Apart from the magazine and the use of the CSL Bureau, for those that use it, we get nothing else here in the bush. So why then should we have to fork out such a large sum when the city facilities are not available? Many of us, I am sure, can find better uses for our \$40, or more, each year, than remaining in the WIA. Unless something changes in the way of reductions to country members, I will be another who becomes a non-member in 1988. I joined the Institute in 1947, and it will not be an easy decision for me to make.

Yours sincerely,

Ted Blackmore VK3TG,
2 Willow Court,
Kyabram, Vic. 3620

By now, Ted, you have read the September editorial about the other WIA services besides the magazine and the CSL Bureau. I joined the WIA in 1945, send few QSLs, due to little time on-air, spend about 40 unpaid hours a month on WIA business, and have never thought of dropping out! —Ed.

INSERT AUGUST AR

This insert contains several erroneous statements and half-truths, a lack of knowledge of the obligations and responsibilities of a licensed radio operator and also ignorance of international and local radio regulations and DOC policies.

With reference to paragraph 2 of the article:

(a) Limited and novice licensees are not and never have been constrained from operating in WICEN Emergency Networks for the following reasons:

ANY licensed amateur radio operator is obliged, under international and local regulations, to answer, if required, distress or urgency calls and to render assistance by all means at his/her disposal on any band and any mode.

This also means operating in WICEN Emergency Networks and, especially if the operator is in a disaster area.

As far as novice operators are concerned, this means, of course, that there is a genuine, not a "manufactured" emergency and the DOC is advised of the action as soon as possible.

This principle was clearly established as far back as 1969/70 by a State Superintendent, DOC, in Western Australia, while I was compiling a WICEN operational plan for that State and it is still accepted policy.

Therefore, I am surprised that Ron Henderson, as Federal WICEN Co-ordinator, should append his name to this erroneous insert since he should be aware of the above facts which are known to most experienced WICEN officers.

(b) WICEN Exercises, Club Stations and Broadcasts:

A limited or novice licensee can operate in WICEN exercises, for the purpose of training on any band, provided that a full licensee is present and supervising.

It also applies to club stations and broadcasts.

Another weak argument is evident in the 'twisted' phrasing of paragraph six, on page one:

The Department has already indicated in letters in AR, that it is not in favour of lowering the novice license standard any further so the reciprocal agreement with Japan hinted at here is just another "red herring".

We should not lower our standards just to suit those of another country, if an Australian amateur wishes to obtain a reciprocal license overseas then he must conform to the standards in that country.

Our 10 WPM Morse versus 12 WPM (International) is an example.

The only fair and logical solution to this very controversial question is for novice licensees to

upgrade if they wish for the privileges that have been worked for by others before them.

Ted Gabriel VK4YG,
PO Box 485,
Ravenshoe, Qld. 2472

Novices at present would not have their own two-metre equipment which could be used for WICEN. —Ed.

FUTURE OF AMATEUR RADIO

For several years I have been reading *Amateur Radio* and other publications of all sorts of problems concerning the future of amateur radio; ie its aging population, reducing numbers, licensing proposals and so forth.

Now I think about the overall structure and running of the amateur service, the more I am convinced that there is basically nothing wrong with our hobby. In fact, I predict it faces a very bright and, maybe, a re-vitalised future with the combining of other technologies into our hobby: ie computers.

But, the amateur service has suffered one major problem and this is the lack of a very effective public relations scheme.

Nobody outside the ranks of amateurs and prospective amateurs, has any knowledge of our hobby. The public impression of amateur radio is that of what Tony Hancock left behind in his television series in the 1950s. He portrayed us as a bunch of old men trying to talk to each other over crackly radios to various parts of the world. I would venture to say that not even many of our wives, children, parents, or whatever, know of the varied facets of our hobby. The above demonstrates the lack of knowledge outside the strict confines of our fraternity.

Do people know that amateurs are a group of people of all ages, sexes, professions, education levels, classes of society, different races, etc? Do people know that these same people have their own satellites, bounced signals off the moon, are involved in television, AMTOR, RTTY, packet radio, and on it goes? Packet radio has the ability to give amateurs the greatest communications network in the world that not even governments could rival. People are not aware that amateurs are involved in civil emergency organisations, radio education schemes, communications for public events, DXpeditions, and again the list goes on and on.

So, instead of talking about new licensing proposals and attracting young people, how about a public relations scheme to simply let people know what amateur radio is all about. The interest generated by such a scheme and, consequently the new converts to amateur radio, will automatically solve many of the problems that confront us.

I have not given any of my ideas for such a public relations scheme, as I am hoping that interest will be generated by this letter first.

Yours,

Tony Lewis VK2EHL,
52 George Street,
Avalon Beach, NSW. 2107

ONLY REAL LINK BONDING US TOGETHER

I would like to comment on the problems with AR. I can easily see that they are serious and there will be no easy solution, and you can be sure someone will be unhappy.

For me? I will be happy if you and your helpers can still produce a publication, because I think it is the life-blood of the Institute. We are in the communication world, but really we do not communicate, now or in the past. We are single units, because we are situated all over the country and, even if we are active, we can only do so much, which is frequently not enough. So, it gets down to the fact that AR is the only real link bonding us together.

I well remember after the war, we had AR with a two colour cover and not very high quality pages, but, so what? The information was there and still is, as my copies are still in good condition.

When the better pages and covers came along, I was very happy about it, but if we have to change

down a few revs, it will not matter, just as long as we get the good information. I would regret a reduction in the number of copies per year, but I would prefer that to no AR at all!

You have my tiny support to do whatever you think best, because it is easy for us, but not for those who have to make the decisions.

73

Arthur Mead VK2JM,
13 Salisbury Avenue,
Bexley, NSW. 2207

NOVICES ON TWO-METRES

I have to agree with VK2XMM, and his comments in *Over to you!* AR, July 1987.

The right to operate on any band must be earned and not given as a gift.

Limited operators are "limited" to the bands 50 MHz and above because they do not possess sufficient skills in Morse code to enable them to pass the Morse test, and until they do they have no right there. Novices have relatively easy access to portions of the HF bands and rightly so, as this gives them a taste of what can be achieved. The reason why they are only given access to certain portions of the HF bands is because they have only a "limited" knowledge of the technical aspects of radio and electronics, and have only passed a five words-per-minute Morse test.

I am not suggesting that full and limited licensees know all there is to know about the technical aspects of radio but we did pass a more difficult examination.

If novices want access to the VHF/UHF bands then let them concentrate their studies on the technical aspects of the examination and forget their Morse practice for a while.

Amateur radio needs new blood to increase its ranks, but why lower the technical standards to attract it? Standards can only be lowered so far before chaos sets in; eg the CB band. How would we go about sorting out that mess? Would we hold examinations to sort out the capable operators from the incapable?

So, come on all you novice operators, you are at least halfway there in the technical paper of the examination. Push a little harder and the rewards will be a little sweeter.

George Christie VK3XEC,
19 Browns Road,
Montrose, Vic. 3765

NOVICE PRIVILEGES ON TWO-METRES

At the last meeting of the Wagga Amateur Radio Club the question of Novice Privileges on two-metres, as discussed at the Federal Convention and the Sydney Forum, on May 22, 1987, was considered.

There were varying opinions as to the desirability of extending Novice Privileges to the two-metre band. However, it was resolved that the club support the proposal for a common band upon which all licensed amateurs may converse.

It was further decided that the WARC should support a concept of two common band allocations, 10 metres FM and 70 centimetres FM, for all licence classes.

The above decisions have been conveyed to the NSW Division of the WIA and the Department of Communications.

Yours faithfully,

W A Short VK2WAS,
Secretary,
Wagga Amateur Radio Club
PO Box 294,
Wagga Wagga, NSW. 2650

NOVICES ON TWO-METRES

I am writing to tell you that I wholeheartedly support the proposal to allocate to novice amateur operators part, or all of the two-metre amateur band.

Changes such as this are long overdue. Amateur radio must catch up with the times if this wonderful hobby is to survive. It is time to give novice operators some of the privileges that they

deserve, as the test is far too difficult when the meagre privileges that they are given are taken into account. The comments that have been made by a small outspoken number of the amateur population against this proposal are little more than foolish and very selfish. It is becoming very obvious through magazine editorials and letter columns that the general opinion of amateurs is that novices do deserve more, and this proposal has started to look at that.

Many ideas have arisen as to what should be done (please note that most of these have been suggested by full calls). It is time for some input as to what novices want, as little has been said by them.

Following are a few suggestions as to what could be done:

1. That novices be allocated part of the two-metre band for use of frequency modulated voice signals and repeater operation with a power output limit of five watts. Also, part or all of the 70-centimetre band be allocated for use of FM voice, packet radio and satellite operation, with a power output limit of 20 watts.
2. That the whole of two-metres be allocated to novices for the use of FM voice with repeater operation and packet radio, with a power output limit of five watts.
3. Finally, as a last resort, the whole of the 70-centimetre band be allocated to novices with FM voice and repeater operation, packet radio, satellite operation, Morse code operation, SSB operation and a power limit of no less than 50 watts.

Two-metres is a far superior band to 70-centimetres in many respects, therefore it is the preferential 'new' situation for novices. It is much better as a common band as it is well used. Because of this, 70-centimetres is better for the other modes of communication such as packet and Morse. More secondhand equipment is available for two-metres, and it is cheaper, therefore making it easier for novices to 'get going'.

I believe that at least one mode of digital communication must be given to novices to attract computer users to the hobby, and therefore attract younger people. I am 15 years old and would like to see more people my age getting into amateur radio.

I am very interested in being able to operate hand-held radios — I like the concept. As an alternative, 10-metres FM has been suggested as an alternative to two-metres, or 70-centimetres, but this does not even interest me in the slightest. Little equipment is available for this band and mode, and, due to the length of antennas, it is not practical to use hand-held radios on this band. (I do not think there are any manufactured for this purpose anyway. If there are, I have not seen or heard of any, so please don't burden novices with another band that hardly anyone uses.

I trust that you will take these suggestions into account.

Yours faithfully,

Dwain Hill VK2MAX,
94 Camden Valley Way,
Narellan, NSW 2567

TEN-METRES AS A COMMON BAND?

An argument exists for provision of a band, or portion of a band, which can be common to all Australian amateurs. Ten-metres has much unused space which we are also in danger of losing if it is not utilised.

As I understand the situation in Japan, there are more amateurs who have not qualified in Morse, operating on HF than there are amateurs operating altogether in Australia.

Would there not be more justification in the extension of privileges to the limited licence holders, who, having passed the full theory examination, are surely more qualified, to operate on a portion of the 10-metre band, (perhaps the space segment that that occupied by present novice licence holders).

This would give all Australian amateurs a common band, and would give the limited licence holders a band on which to practice their Morse code with a view to upgrading their licence.

Our novice licence holders have already more privileges than that of most overseas countries, so

they cannot complain. My own incentive to upgrade from the novice licence was prompted by a desire to operate on my own choice of available band-space, which meant an AOCF or remain confined!

Passing the theory really widened my horizons, and the full Morse gave me that extra vista of spectrum.

As regards greater utilisation of the two-metre band, extension of these privileges to novices would, in city areas, probably result in cramped band-space, and have no noticeable effect in country areas.

Yours sincerely,

John Brennan VK4SZ,
10 Tulip Street,
Innisfail, Qld. 4860

NON-PARTICIPATION

I read with regret of the decision of the Geelong Amateur Radio Club not to participate in the 1987 John Moyle Memorial Field Day Contest, AR, April 1987.

However, the club's claim that the 1987 rules gave little incentive to multi-operator stations to set up HF equipment hardly seems to be supported in the contest results published in AR, July 1987.

Of the 68 logs published (excluding SWL and check logs), 30 were from multi-operator field stations. The open section for these stations (section f) was the biggest category of entries, followed by the phone section (g).

Within the 24-hour category, multi-operator stations accounted for 22 of the 38 logs, that is, more than half.

This suggests that the rules were quite satisfactory to many clubs and other multi-operator groups, despite the GARC's decision to take its bat and ball home and not join in the game.

I also think the GARC is in error in its comments on the role of VHF in emergency situations. Certainly nobody assumes that 'all emergency traffic' would be handled on VHF bands in an emergency situation, and to raise such a point is merely dragging a red herring across the path of debate. It is much more relevant to note that it is hard to conceive of a well-equipped, flexible emergency operation which did not include VHF among its resources, as an auxiliary to HF.

It is, as the GARC claims, the scoring system is 'ridiculous' and the multipliers for VHF contacts 'disproportionately large' then the solution is to reduce the multipliers. It is not to be found in boycotting the contest, nor in removing the VHF component, as seems to be under consideration.

I predict that, if the VHF component is eliminated from the John Moyle Memorial Field Day Contest, there will be a fall in the number of individual amateurs taking part, both in multi-operator teams and in solo activity.

Ken Goff VK3AJJ,
38A Lansdowne Road,
Saint Kilda, Vic. 3183

HONOUR ROLL

I have just returned from a post-retirement coach tour of Northern Australia, and found my copy of July AR had arrived during my absence. I had intended to write to you in due course, but the Remembrance Day Contest notices prompted me to do it right now, in order to correct what I believe to be a long-standing error in the Honour Roll listing.

Having been the licensee of VK3PV since 1947, and with my predecessor having his name engraved on the Remembrance Day Contest Trophy, I have been curious for many years to learn something of the man himself, and have spoken to some of the contemporaries who knew Reginald P Veall. It was my understanding that he was a young Radio Officer in the Merchant Navy listing, who was killed in the first air raid on Darwin, in 1942, having unfortunately transferred from another vessel for that fateful voyage to Darwin.

In the early post-war years, the AR Remembrance Day Honour Roll listed him as being 'MN' but after some years this was changed to 'AMN' and I wondered why the listing was altered. Perhaps it should now be corrected for posterity.

After leaving Darwin in the coach on the return trip home, we visited the Adelaide River War Cemetery, where the graves of the WWII Darwin air raid victims are located. Just inside the entrance archway is a memorial to a group of young men whose names are engraved on it. One of them I found the name of Merchant Navy Radio Officer R P Veall, among a short list of other 'MN' Radio Officers.

Due to the very limited time that we could spend at the War Cemetery, I searched for, but was unable to find his grave or headstone plaque. It is possible that he is buried among a group of young men whose names are engraved on it. One of them I found the name of Merchant Navy Radio Officer R P Veall, among a short list of other 'MN' Radio Officers.

I found this to be a very moving experience in this beautifully kept lawn cemetery, where Reginald P Veall rests in peace.

Let me forget!

73,

Don Shaw VK3PV/VK2BDS,
48 Thirteenth Street,
Warragamba, NSW. 2752.

RE CALL BOOK ANNOTATIONS

I am surprised and puzzled that the WIA intends to cease the practice of indicating calls who are WIA members by an asterisk in the Call Book.

I am disappointed that the WIA is scrapping a very logical idea in defence some illogical complaints. Members of any organisation are entitled, indeed should be aware of who else are members of their organisation. This was a very simple way of achieving this.

I cannot understand why any member should be ashamed of being in the WIA. He should wish to keep it a secret. Like it or not, the WIA is the organisation representing amateurs to the authorities. It is not perfect, but no organisation is. Its work is done, in the main, by volunteers and so must be limited.

The WIA will not assist its cause by burying its head in the sand and hiding its identity. Those who are in the WIA should be proud of it. They should stand up and be counted and not hide in shame. With ever increasing pressure on spectrum space, the WIA needs all the support it can get. It will be too late to whinge when the frequencies have gone out the gate.

I recognise that some people may be embarrassed by the lack of a * before their name. They should be. If they feel that amateur radio is not secure that it does not need their support they should not mind standing by their opinion. I concur that anyone who wants particular details omitted should be able to have it done.

Equally, however, I feel that those who do wish to have their WIA membership signified should be given the option. This could be achieved quite easily. On the next subscription renewal form could be included a yes/no check square to answer the question as to whether the member wants the signification or not. These forms are returned early in the year, in plenty of time for the wishes indicated to be included in the next Call Book.

Personally, I am not ashamed to be a member of the WIA and I do wish to have it signified in the Call Book.

73,

John Alcorn VK2JWA,
33 Spring Street,
Lismore, NSW. 2480

INFORMING MEMBERS

The recent reformation (or deferment) by DOC of the WIA's recommendation to extend the use of two-metres to novices, brings to the fore the very unsatisfactory arrangement of deciding policy matters on an annual subscription renewal form. Members have no hope of commenting on a subject before the vote is taken.

This matter has been fermenting amongst members for some time and it is about time that Federal Executive took notice of the situation. I have written to the Federal Office on two occasions (with follow-up letters) bringing the subject

to notice, but have yet to receive an acknowledgment or reply.

Some 20 to 25 years ago, it was possible to list in AR the subjects for discussion some two or three months before the Convention. This gave members a chance to know what was to be discussed, have an input to the Division, if necessary and to follow up the subjects of interest to learn of WIA policy. This procedure should be re-introduced.

At the present time, policy is decided and members never know.

Excuses such as:

- (a) It would occupy too much space in AR, and
 - (b) there is not enough time
- are not satisfactory or acceptable.

AR is the *Journal of the WIA* we are told and, as such, is the medium for the dissemination of proposed WIA policy. It has also been said that some agenda items come in "at the last moment". Is this any way to conduct a Conference for a Chairman to accept such items?

A cut off date for agenda items (for example, December 31, or a date to allow publication in February AR of each year) should be published and adhered to. This would allow member comment to the Federal Councillor prior to April.

Again this week (July 12, 1987), the broadcast suggested that members keep in touch with the Federal Councillor for Federal Information. In the last 12 months or so, I have written to the Federal Councillor with follow-ups on each occasion, and I have yet to get a squeak out of him. So please, don't let me to keep in touch with the FC.

While I very much appreciate the good work of VK3ARZ and VK3OM, with Federal tape broadcasts, this method is not an alternative to publication in AR.

So, to the Federal Executive, I say, notwithstanding T/T, facsimile, ATV, packet, etc, etc, go back 25 years and let all members have a look at what is to be discussed at the Annual Convention and you may get the member participation that you have been calling for.

Members just do not know what is going on and it is very hard to find out.

R Torrington VK3TJ,
4 Thistle Street,
Pascoe Vale South, Vic. 3044

TRAILING ANTENNA — AERONAUTICAL MOBILE

In the August issue, Geoff Campbell is perfectly correct in his condemnation of Jeffrey Thornton's father for using half a house brick on the end of a trailing aerial from an aircraft.

As a pilot of over 35 years, I was appalled when I read the article in AR June 1987 and, as the story was included in AR June as well, the DOA may well investigate the matter.

When it comes to aircraft you cannot foot around. I am glad I was not flying beneath this aircraft as the thought of what a half brick could do to any aircraft, if it came loose, is too terrifying to contemplate.

A simple plastic funnel would have acted as a drogue, but as Geoff says, it must be DOA approved.

Yours faithfully,

Noel Abel VK3YUO,
Rowallan Avenue,
Harkaway, Vic. 3806

Group-Captain (Bon) Hall said in his book, *A Saga of Achievement* that some 5000 wireless mechanics were trained at ISTT during the war years. On being asked about a reunion for "other ranks" he said he thought it would be terrific as there was a very close bond between us and warned that, unless it is arranged soon, it will be too late.

As this is not for amateurs exclusively, I shall also write to the service magazines to ascertain how many would be interested.

It is up to you! If you are interested and have suggestions or are willing to help arrange a reunion, please let me know.

Yours faithfully,

Noel Abel VK3YUO,
Rowallan Avenue,
Harkaway, Vic. 3806

AMATEURS, LOOK AT YOURSELVES!

In reading and listening to all the ifs and buts of Bands, Licence Grades, Novices on Two-metres, Common Band for all Amateurs, and the incentive to Upgrade to Full Call, I have never heard so much snobbery and discrimination as exists in the hobby of amateur radio. I strongly suggest the time has arrived when we must all look at ourselves and put away our dog-in-the-manger attitudes. Despite whatever you may think, there is definitely class distinction in amateur radio. One has only to look at the allocation of band space for novice, limited or full call, to realise where class distinction lies.

We are all amateurs, no matter what grade of licence we may hold and I feel sure we would all love to hold a full call licence, but many of us do not and I stress **do not** have the capability to do CW at 10 WPM, etc. That is not to say we are not good amateur operators and, as such, we should be allowed to use all bands with, maybe, power restrictions for some classes of licence.

Let's face it, the spectrum is really public property, to be shared by all, so why can't all amateurs share all their allocated bands on an equal footing. We are all amateurs despite our class of licence. Once again, we cannot all have a full call due to the plain fact all things in this world of ours are not, and cannot be equal. We have the rich, and the poor. We have the sick and the healthy. We have the master and the slave. We also have the young and the old. But, despite all of this, no consideration is given to one's ability and, I am sure many a good budding amateur has given the hobby away because of not being equal to the task.

One often hears "If a thing is not earned it is not appreciated". What a lot of tripe! I know from my own experience, it took me five years to obtain my novice call and another two years for my limited, now, at 71 years of age I am still expected to study further to 10 WPM for a full call. But, after passing 10 WPM Morse, I know I would never use it again.

In no way whatever would it make me a better amateur. I am sure I home-brew in my field of antennas much more than most amateurs including full calls, and can operate with the best of them.

Yes, "amateurs look at yourselves". As for myself — the time is close to where this old horse has been whipped too much and I am now seriously considering giving the whole game away.

73 de,

Jim Thornton VK2KAX,
Box 80,
Umina, NSW. 2257

NOTHING WORTHWHILE...

There is much being said regarding extension of two-metre privileges to novice operators, using as an argument, the "need" for a common band. Sounds reasonable, until one stops to remember that if only the Limited Certificate holders would get off their seats and do a simple Morse examination, there would be, no one, but three common bands at least. So, come on, you limited guys and gals, go for it!

The Novice operators have an excellent deal as it is. I was a novice once, and really appreciated the privileges I had. My earnest wish to operate on two-metres provided me with the incentive to upgrade, which, together with thousands of other novices, I managed, with just a little effort.

As I keep telling my youngsters, "Nothing worthwhile ever comes easy!"

With thanks,

John Brennan VK4SZ,
10 Tulip Street,
Innisfail, Qld. 4860

Solution to Morseword 7

Across: 1 pier 2 notes 3 base 4 dates 5 rive 6 Maud 7 aver 8 natter 9 lac 10 rift

Down: 1 amend 2 bow 3 miss 4 real 5 entire 6 jug 7 suite 8 hast 9 dawn 10 hist

	1	2	3	4	5	6	7	8	9	10
1
2
3
4
5
6
7
8
9
10

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Catering for
**AMATEUR,
COMMERCIAL,
GOVERNMENT**

Call in at:

**75 Grand Boulevard,
Montmorency, Vic.
3094**

or phone

(03) 431 1153

Gary VK3ZHP

PROPOSED WWII RAAF REUNION

In times of conflict in which Australia was involved, amateurs were never slow in offering their services and skills to serve their country.

Even before WWII hostilities began, Bob Cunningham and others formed the RAAF Wireless Reserve to be ready when the time came.

In the past, many groups have held reunions but, I do not know of ex-RAAF Wireless Mechanics getting together and reliving the past for a short while.

The Signals Officers do so annually and have done so since the end of the war. Everyone knows it was the "Indians" who actually did the work, so why don't we hold our reunion for all involved in RAAF radio during WWII?

Obituaries

CLIVE BURNS VK3CQL

With regret we announce the passing at the end of July, of Clive Burns VK3CQL. Clive was well-known on the bands, particularly to many of the 80-metre CW operators, both for his excellent sending and his happy disposition and eagerness to help others.

Clive passed away after a long illness at Myrtleford Hospital.

Deepest sympathy is extended to his wife and family.

—Contributed by B J Waldron VK3BND

ALBERT EDWARD ANDREWS VK2PKM

With very great sorrow I report the untimely death of "Andy" Andrews, aged 73, at Sutherland Hospital on July 31, 1987. Andy died as the result of a road accident.

Andy was born in London on October 3, 1913, and spent the Depression Years of his early working life employed in the Fleet Street newspaper industry.

The outbreak of World War II found him a member of the Welsh Guards, with whom he served until the end of hostilities. His particular duties were those of signaller which introduced him to many forms of communication including radio.

After the war Andy came to Australia with his wife Carol and daughters, Julie and Gillian, and settled first in Brisbane and later moving to the Sydney suburb of Oatley, where he established a delivery business.

Andy was a keen boat-builder and sailor, having had his first sailing experiences on the Norfolk Broads.

As the "weariness of age" crept up on him, Andy sold his yacht and concentrated his interest on radio, acquired his novice call and set up his shack from which he operated while studying for his full call.

Following an accident on his recently acquired motor cycle, Andy was under intensive care for several weeks in Sutherland Hospital and died on July 31, 1987.

Andy's funeral was held at the Woronora Cemetery, attended by his family and friends of both his sailing and radio days.

He was a generous, industrious, ever-helpful, trusting and trusting friend with whom I shared many happy experiences, the memories of which I shall always treasure.

He is survived by his wife Carol, daughters Julie and Gillian, son-in-law Graham and grandsons Christopher and Mark, whom together with his many friends, mourn his passing.

—Contributed by Oliver Sleeman VK2AOW

H N (Pete) BOWMAN VK5FM

Pete Bowman died at his home in Bridgewater, SA, on July 19, aged 78. He will be greatly missed by all his friends.

Pete was first licenced as VK5FM in March 1932, and has held this call sign ever since. He held a first class operator's certificate, which he gained in 1940, and was a member of that distinguished group, the FOC.

From 1947 to 1954 Pete was a Councillor with the Royal Flying Doctor Service and acted as an intermediary between the council, in Adelaide, and Graham Pitts VK5RG, at the base station in Alice Springs. He was also Federal President of the WIA in 1934, Federal Traffic Manager from 1934 to 1936, and Vice-President of the VK5 Division in 1939.

Pete began his working life at Waymouth Motors, Adelaide, where he became their test driver. He joined the staff of SAE in 1937, and told many amusing anecdotes of his encounters with radio personalities of the time and his experiences during recording sessions with them. He moved to SPI, Crystal Brook, in 1959, and remained there until 1961 when he joined the staff of Channel 7 television. He worked at the transmitter site, on Mount Lofty, until his retirement.

VK5FM, was one of the most consistently active amateurs in the State. CW was his favourite mode of operation, but he also held regular SSB seshes with his friends in England and the USA, most of whom knew him personally. His immaculate fist will be greatly missed by his friends all over the world. He will also be sadly missed by his wife, Eunice.

—Contributed by Dave Robertson VK5FN

PROF J D McGEE

Professor James Dwyer McGee, who recently died in New Zealand aged 84, played a vital role in the development of high-definition television in the 1930s, and during the 1939-45 War pioneered infra-red sensitive image intensifiers for "seeing in the dark."

When the Professor accepted a post in the EMI Laboratories at Hayes in 1932 to work on the development of television, he was told by James Clerk Maxwell, under whom he had studied for his doctorate at the Cavendish Laboratory, Cambridge: "I don't think this television business will ever come to much, but it will keep you going until we can get you a proper job."

Television was then being implemented by mainly mechanical means, but at EMI the head of research, Isaac Schoenberg, had decided that the main effort should be the development of a cathode-ray tube receiver. McGee initially worked on this but he soon realised that an electronic camera at the transmitter would be essential.

Schoenberg strongly disagreed, but McGee and his colleague W F Tedham, clandestinely built a rudimentary camera tube based on proposals of the University of Cambridge. The British physicist Campbell-Swinton in 1911. This worked well enough to persuade Schoenberg to go to his board for funds to develop what became the Marconi-EMI system, adopted by the BBC for the world's first public high-definition television service in 1936.

Professor McGee was responsible for the development of the camera tubes and produced fully operational ones in time for the opening of the television service in 1936 and the outside broadcast of the coronation in 1937.

There have been suggestions that EMI benefitted from technical information from RCA in the United States, where V K Zworykin, a pioneer of camera tube development a few years previously, but even if this were true, McGee's achievement was a *tour de force* in view of the great technical difficulties involved.

James Dwyer McGee was born in Canberra, in 1903, and educated at Saint Patrick's College, Goulburn, and Saint John's College, Sydney University, graduated with a first class degree in Physics and mathematics and staying on to research into the motion of electrons in gases.

In 1926, he was awarded an 1961 Exhibition Scholarship which took him to Clare College, Cambridge, UK.

In 1954, the physicist Professor Blackett of the Imperial College of Science and Technology, London University, persuaded him to accept the Chair of Instrument Technology (later Applied Physics) at the college.

Blackett's aim was to encourage the application of advanced photo-electronic techniques in physics research, and Professor McGee was brilliantly successful in achieving this: by setting up a group developing new photo-electronic detectors, by stimulating the interest of, for example, astronomers and nuclear physicists, and by encouraging industry to market devices.

His influence was international, particularly through the triennial symposia on photo-electronics he held at the college. Although many of the detectors developed by his group helped to make important observations in several fields of science, his most enduring achievement was in inspiring his colleagues and that many research students who have gone on to pursue successful careers in the universities and industry.

The Professor was bestowed with an OBE in 1952 and elected a Fellow of the Royal Society in 1968. He retired in 1971 as Emeritus Professor and Fellow of Imperial College, but continued to be scientifically active, and in 1980 he returned to live in Australia.

He had a warm personality and, although he ran his department somewhat autocratically, he was always approachable. His main recreation was listening to music and he was particularly fond of the operas of Wagner. In earlier years he was a keen skier.

In 1944 he married Hilda Winstone, of Auckland, New Zealand, who survives him.

From the London Daily Telegraph, July 1987. Contributed by

E B Britton VK1BE

Magazine Review

Roy Hartkopf VK3AOH

34 Toolangi Road, Alphonso, Vic. 3087

- G General
- C Constructional
- P Practical without detailed constructional information
- T Theoretical
- N Of particular interest to the novice
- X Computer program.

CO — June 1987. VHF special issue. Classic Morse Keys. (G)

RADIO COMMUNICATION — August 1987. Crystal Calibrator. (C & N) Low Cost Keyer. (C & N) "Super-DC-Gainer" Front End. (T)

WORLDWIDE — July 1987. News of World-Wide Amateur Radio activity, DXpeditions, contests, etc.

VHF COMMUNICATIONS — 1/1987. Index for 1986. (G) 10 kHz to 30 MHz Receiver Front End. (C)

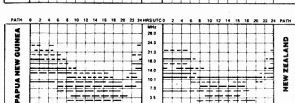
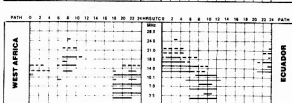
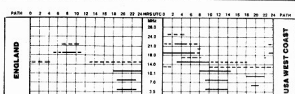
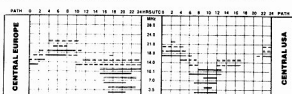
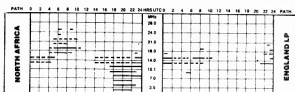
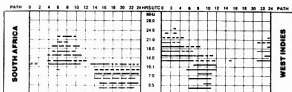
RADIO COMMUNICATION — July 1987. Versatile AF Active Filter. (P & N)

BREAK IN — June 1987. 25th Anniversary issue. WARO special issue. (G)

QST — June 1987. ARRL National Convention. (G) Two-metre Receiver and Scanner. (P) Rechargeable Lithium Cell. (G & N) Lead Acid Charger Integrated Circuit. Voice Activated Squelch. 2 GHz Prescalers. (New product review) Build your own Mini-Circuit Modules. (P & N)

Ionospheric Predictions

Len Poynter VK3BYE
14 Esther Court, Fawkner, Vic. 3060



LEGEND
From Western Australia (Perth)
From Eastern Australia (Canberra)

Mixed mode dependent on angle of radiation (long broken lines)

Better than 50% of the month, but not every day continuous line

All paths unless otherwise indicated; (ie LP = Long Path) or Short Path.

Less than 50% of the month (short broken lines)

Predictions are presented courtesy of the Department of Science, IPS Radio and Space Services, Sydney.

Solar Geophysical Summary

JUNE 1987

Solar activity was low during the month with no energetic flares being observed. There were a number of small solar regions visible on the solar disc for most of the month, although the sun was spotless during the periods 3, 4 and 6 to 10.

The 10 centimetre flux varied from 76 to a high of 86 on the 24th to a low of 68.

The monthly average sunspot number was down on the values for the last two months indicating the end of the recent burst of region growth. However, the yearly averaged sunspot

number for December 1986, continued the upward trend since the solar minimum in September 1986. Sunspot average for June 17.5
Sunspot yearly average 12/86 16.1
A average for June 8.6

GEOMAGNETIC ACTIVITY

The only significant disturbance during the month was on the 6th when the A-index reached 23.

—Compiled by Len Poynter VK3BYE, from data supplied by the Department of Science IPS Radio and Space Services —
June 1987

PROPAGATION REPORTS

There is now day-to-day information available for those wishing to check on solar and geomagnetic activity.

WWV, from Boulder Colorado, USA, on 5, 10, and 15 MHz, at 18 minutes past each hour, provide the previous UTC day's solar flux and estimated A-index, along with the present UTC day's K-index (changed three-hourly).

IPS Radio and Space Services provide a phone-in service on (02) 269 8614, basically the same as WWV, but without today's K-indexes, but giving a summary of any "events" that would affect propagation in our portion of the globe.

A recently introduced service is now available from Radio Australia, five times each UTC day. At 0425, 0825, 1225, 1625, 2025 UTC, Monday to Saturday. Radio Australia has some 29 frequencies in use during each day.

A copy of Radio Australia's English Service Guide, which lists frequencies and times of their English programs, can be obtained from Radio Australia, GPO Box 428G, Melbourne, Vic. 3001.

—Contributed by Len Poynter VK3BYE

Silent Keys

MR A E (ANDY) ANDREWS
MR A I K (BERT) CLARKE
MR G MAXWELL HULL
MR HAROLD ALTON LEE
MR LYNTO JAMES PASSMORE
MR L J SIMMONS

VK2PKM
VK2IC
VK3ZS
VK6AE
VK2ETE
VK3LV



DEADLINE

All copy for inclusion in the **December 1987** issue of *Amateur Radio*, including regular columns and Hamads, must arrive at **PO Box 300, Caulfield South, VIC 3162**, at the latest, by 9 am, October 19, 1987.

Hamads

PLEASE NOTE: If you are advertising items **FOR SALE** and **WANTED** please write each on a separate sheet of paper, and include all details; eg Name, Address, Telephone Number, on both sheets. Please write copy for your Hamad as clearly as possible. **Please do not use scraps of paper.**

- Please remember your STD code with telephone numbers
- Eight lines free to all WIA members. \$9.00 per 10 words minimum for non-members
- Copy in typewritten, or block letters — double-spaced to **Box 300, Caulfield South, VIC 3162**
- Repeats may be charged at full rates
- OTHR means address is correct as set out in the WIA current Call Book

Ordinary Hamads submitted from members who are deemed to be in the general electronics retail and wholesale distributive trades shall be classified as referring only to private articles not being re-sold for merchandising purposes.

Conditions for commercial advertising are as follows:
\$2.00 for four lines, plus \$2.00 per line (for part thereof)
Minimum charge — **\$22.50 pre-payable**
Copy is required by the Deadline as indicated on page 1 of each issue.

TRADE ADS

AMIDON FERROMAGNETIC CORES: Large range for all receiver and Transmitting Applications. For date and price list send 10¢ x 220 mm SASE to: **RJ & US IMPORTS**, Box 157, Morildale, NSW 2223. No inquiries at office... 11 Macken Street, Oakley. Agencies at: Geoff Wood Electronics, Lane Cove, NSW. Wides Electronics, Auburn, NSW. Truscott Electronics, Croydon, Vic. Willis Trading Co, Perth, WA. Electronic Components, Fishwick, Plaza, ACT.

WANTED TO SWAP — VIC

FT-200 WITH POWER SUPPLY & SPARE 6SJ6 FINALS: All in good condition. For rig equipped for 12 volt DC operation; eg FT-101 or similar, in good condition. Prepared to negotiate difference in cash value if necessary. Ron VK3QPR. Ph: (03) 578 3393.

WANTED TO SWAP — QLD

TWO KINGSLEY COMMS REC: KICR11 Mod AR7 power supplies, box of coils. Both need slight attention. Swap for vintage B/C rec or Morse gear, Galvano-meter, sounder, etc. Roland Clark VK4EG, 5 Tallaroon Street, Jindalee, Qld 4042. Ph: (07) 376 4772.

WANTED — ACT

HANDBOOK/CIRCUIT: for restoration of Pyrex Wire Recorder Type CWR Model 31, 1946 era. Will copy and return. Postage paid. Jack VK1FL, QTHR.

WANTED — NSW

DRAKE RTA, JRC NRD-515 RECEIVERS: K-X3, SX-3 Mizuho Antenna tuners. Tony. Ph: (042) 29 2573.

GOOD QUALITY MORSE KEY: Required by David VK2XVF. Ph: (047) 51 1658.

ICOM IC-22A: or similar crystal-controlled transceiver. VK2SW, QTHR. Ph: (069) 22 6082 AH.

PAIR OF 572B: for FT-2100B. VK2AGA, QTHR. Ph: (069) 53 9607.

SOLID-STATE HF TRANSCEIVER: with manual, band-switching, Swan 100MK, Atlas 210X/215X. Others also considered. VK2CFM, PO Box J221, Coffs Harbour Jetty, NSW 2451. Ph: (066) 53 2463.

WANTED — VIC

HF LINEAR AMP: in good condition & at a realistic price. John. Ph: (03) 743 9697.

TRIO GDO TYPE VM-108: with all coils & probes in good condition. Jim VK3JL, QTHR. Ph: (03) 598 4192.

WANTED — QLD

DEAD OR ALIVE: Type 3 Mark 2, complete with parts, manual. WHY? Also require Drake AC3 DC4 PSU. VK4FUS. Ph: (077) 75 3816.

ICOM IC-745 HF TRANSCEIVER: with power supply. Would need to be in VOG. John VK4YX, QTHR. Ph: (078) 61 4877.

KENWOOD TS-130S, ICOM IC-730: or similar compact, modern, HF transceiver in top condition required. Also, Hustler HF vertical antenna. Details to John Brennan VK4SZ, QTHR. Ph: (070) 61 3286.

SELF-STANDING TOWER: Contact Henri. Ph: (07) 881 1125.

YAESU FV-707DM DIGITAL FV: Must be in good condition. Steve VK4KHQ, QTHR. Ph: (077) 43 4508 (BH), (077) 44 3100 (AH).

WANTED — WA

CRYSTALS: for 3.525-3.540 MHz (any size). Also, large type with removable crystal such as FT-243 for 3-3.5 MHz. Also wanted — a crystal for 5.15, 12.15, 20 or 25 kHz. Write to Peter Parker VK6NNN, C/- PO Wiltchellie, WA, 6286.

Q83/300 CERAMIC VALVE BASE: & characteristics of this valve. Ken VK6ZA, QTHR. Ph: (08) 398 7629.

FOR SALE — ACT

DC200 12V POWER SUPPLY: for FT-200. \$75. VK1BE, QTHR. Ph: (062) 81 3301.

GALAXY 5 MK3 HF TRANSCEIVER: + spare tubes. \$400. Professional G4ZU Triband Mini-beam. \$75. Pys 6 chnl transceiver. \$30. FDK Multi 7 transceiver with guss mount antenna. \$150. The 9F500E HF receiver. \$75. Items of valve type test equipment & historic equipment for negotiation. (Pre-war Hallicrafter). Miscellaneous AR equipment. Too many to list. George Allen VK1KG, 16 Badcoe Street, Goerick, ACT 2904. Ph: (062) 92 3869.

FOR SALE — NSW

AS NEW: 70 cm equipment used only a few times on OSCAR. Icom IC-380 multi-mode transceiver & a similarly little used Tokyo HL80U 50 watt linear with GAAS-ET preamp. \$280 for the units as a pair (carriers). Perfect for OSCAR. VK2SW, QTHR. Ph: (069) 22 6082 (AH).

CRANK-UP TOWER: Hills, 50 ft, c/w base plate, guys, bolts, etc. Must sell to meet other commitments. \$350. ONO. Glen VK2AGM, QTHR. Ph: (02) 266 9152 (BH) or (02) 77 8407 (AH).

KENWOOD AT-250 FULL AUTOMATIC ANTENNA TUNER: four position auto switch 20/200 watt PEP FVWV SWR metre 24V or 13.8V. Very good condition. \$480 or nearest offer. Mark Gorski VK2NMG. Ph: (02) 648 3711.

KENWOOD TS-430S HF TRANSCEIVER: all HF bands with min. 1.5-30 MHz. Mint condition. \$480 or nearest offer. Dan VK2AGM, QTHR. Ph: (02) 212 3833 (AH) 328 1261.

PYE 10V VHF AM TRANSCEIVER: Consists of R657 receiver & TG36 transmitter. Both in operational condition in a self-contained 19" rack cabinet. Crystal controlled & currently on 79.6 MHz. Offers to Mark VK2EMG. Ph: (02) 85 6870.

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YAESU FT-101 HF TRANSCEIVER & MATCHING FV-101 EXTERNAL FV: Both in very good condition & operator manuals for both. \$350 the pair. Bert VK2OW, QTHR. Ph: (02) 76 5730.

YAESU FT-101E: Some spares, \$400. Yaesu YD-148 mic, new. \$30. Katsumi MK1024 programmable keyer, 100, Microton 24 hr digital clock, \$25. Multi-7 2m xvr, AC supply. Xials 4 channels, \$150. Estate of VK2IC. Stan VK2EL, QTHR. Ph: (02) 523 1293.

YAESU FT-102: AM/FM broad & narrow SSB stat fitted. Spare set PA tubes. Oakerblock power/SWR meter, manuals. \$1200. Ph: (046) 77 1842.

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frequency meter. \$60. All original condition and with manuals. Ray VK2APW, QTHR. Ph: (02) 44 7582.

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HY-GAIN 244 HY-QUAD TRI-BANDER. Ph: (053) 32 8314.

KENWOOD TR-2600A TWO-METRE HAND-HELD TRANSCEIVER: as new. Recharged only three times. 2.5 watt, charger, book, carton, 10 memories. As purchased \$400. Geoff VK3GV, QTHR. Ph: (03) 560 3773.

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DICK SMITH HORNET CB: Converted to cover 28-245-28.685 MHz SSB. VGC. \$150. Also Yaesu FV-110 linear amp in excellent condition. \$200 plus freight. Steve VK4KHQ, QTHR. Ph: (077) 43 4508 (BH) or (077) 44 3100 (AH).

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STOLEN EQUIPMENT

Kenwood TM-221A, Serial number 8022541.
Kenwood TS-700A, Serial number 350-409.
Icom 502, Serial number 006816.
Icom 502, Serial number 03482.
The above equipment has been stolen from H Rider VK3ZJY. Any reader who may locate any or all of the above equipment is asked to contact their nearest police station or contact the Federal Office of the WIA.

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